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ABSTRACT

This document briefly describes Phase I of the Preschool Project. The research from 1969-72, Phase II, focuses on how the experiences and environments of highly competent and less competent children differ in early childhood. It is theorized that intellectual development is a function of a child's interaction with his human and physical environment. The project is categorized as a natural experiment because researchers (1) observed children in their natural milieu, (2) emphasized the role of normal experiences in intellectual and social development, and (3) examined children from contrasting socioeconomic groups based on their predicted level of social competence by age 3. Subjects, 40 normal children, ages 1 to 3, were tested periodically on intelligence and social competence. Observational instruments were developed to measure the effects of the human and physical environment. Four case studies illustrate different kinds of environment and developmental patterns. Discussion of the nature-nuture controversy includes implications for the interactional model of development on which the study is based. (DP)

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FINAL REPORT
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PRE-SCHOOL PROJECT

ENVIRONMENT, EXPERIENCE AND DEVELOPMENT IN EARLY CHILDHOOD

by

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January, 1973

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TABLE OF CONTENTS

ENVIRONMENTS OF CHILDHOOD

Page

Chapter I. The Natural Experiment: An Approach to the Scientific Study of Development in Young Children 1

History and Organization of the Preschool Project 3

Phase I: An Observational Study of Children 3-6 Years Old . . 4

Defining Intellectual and Social Competence in Young Children 6

Non-social Abilities 6

Social Abilities 7

Phase II: The Longitudinal "Natural Experiment" on One- to Three-Year-Olds 8

Design and Sample Characteristics at Recruitment 8

Predicting Intellectual and Social Competence in One- and Two-Year-Olds for Purposes of Recruitment 9

Methods of Recruiting Subjects 12

Social Class of Subjects 20

Recruiting Predicted A and C Children from Different Social Class Backgrounds 21

Chapter II. Assessing Intellectual and Social Competence from Age One to Three 24

Instruments to Screen Out Handicapped Children 24

Testing Schedule 24

Tests of Intellectual Competence 25

Language Abilities 25

Abstract Abilities 28

The Ability to Sense Dissonance 29

General Development and Intelligence Tests 29

Evaluation of Social Competence 30

Tested Versus Predicted Competence: Implications for Study Design 30

Two-Year-Old Starters 31

Tested Intellectual Competence 31

Page

Social Competence Evaluations 33
Grouping the Sample for Data Analysis in the Light of Tested Competence Levels 36
Comparison of Groups on Tested Intellectual Competence 36
  General Mental Development 37
  Language Development 37
  Development of Abstract Abilities 39
Suitability of Two-Year-Old Starters for Testing Hypotheses . . 39
One-Year-Old Starters 41
Tested Intellectual Competence 41
Grouping the Sample for Data Analysis in the Light of Tested Competence Levels 44
Comparison of Groups on Tested Intellectual Competence 45
  General Mental Development 45
  Language Development. 50
  Development of Abstract Abilities 51
Suitability of One-Year-Old Starters for Testing Hypotheses . . 51

Chapter III. Observing the Child's Environment 59
Assessing the Child's Environment 59
Definition of Environment 60
Scales for Assessing the Direct Role Played by the Child's Environment in His Experience 65
  The Human Interaction Scale 66
    Quality of Interaction: Content 67
    Quality of Interaction: Value 71
    Criteria for Judging the Intellectual Value of an Interaction 73
    Style of Interaction: Techniques 78
    Interaction: The Remaining Dimensions 86
  The Object Interaction Scale 89
  Questionnaires for Evaluating Other Aspects of the Child's Environment 90
  Summary 92

Page

Chapter IV Comparing Environments 95

Design of the Study 96

Observational Schedule: When, Who and Where we Observe . 99

Method of Observation: Who Observes and How They Observe 102

Possible Sources of Error in our Findings 103

Methods of Data Analysis 104

1. Age Groups 105

2. Competence and Social Class 106

3. Raw Data Treatments 107

4. Definition of the term "Interactor" 113

5. Statistical Technique 114

Hypotheses 114

Results: Two-Year-Old Starters 116

Middle-Class As versus Working-Class Cs 116

Quantity of Interaction. 116

Quality of Interaction: Value and Content 116

Style of Interaction: Techniques 124

Attitude to the Child: Encouragement 137

Working-Class As versus Working-Class Cs 140

Quantity of Interaction. 141

Quality of Interaction: Content and Value 145

Style of Interaction: Techniques 146

Attitude to the Child: Encouragement 154

Another Method of Controlling for Social Class Differences 155

Result: One-Year-Old Starters 169

Middle-Class As versus Working-Class Cs 169

Quantity of Interaction 169

Quality of Interaction: Value and Content 169

Style and Attitude: Techniques and Encouragement . . 174

Working-Class As versus Working-Class Cs. 175

Summary 186

Page

Chapter V Four Children: Four Environments 189
The Children of the Case Studies 190
Sandra - a one-year-old "A" Girl 190
Sandra's Background: Physical Environment 190
Human Environment 192
Observations on Sandra 192
Cathy: a one-year-old "C" Girl 205
Cathy's Background: Physical Environment 205
Human Environment 206
Observations on Cathy 207
Nancy: a two-year-old "A" Girl 222
Nancy's Background: Physical Environment 223
Human Environment 224
Observations on Nancy 225
Robert: a two-year-old "C" Boy 230
Robert's Background: Physical Environment 230
Human Environment 231
Observations on Robert 231

Chapter VI Discussion and Conclusions 237
Model of Intellectual Development Underlying our Research . . . 237
The General Role of the Human Environment in the Child's Interactional Experiences 238
An Analysis of Specific Roles Played by Interactors in the Child's Experiences 239
Differences in the Roles Played by Interactors with Well-Developing and Poorly-Developing Children 240
The Key Role of the Mother: The bringing about of intellectually valuable experiences for the child. 242
Recommendations for Further Research 245
Recommendations for Practical Applications 246

References 253
Appendix 255

List of Tables

Table #	Name	Page
I-1.	Methods and Sources of Recruitment of Subjects - One-Year-Old Starters	15
I-2.	Methods and Sources of Recruitment of Subjects - Two-Year-Old Starters	17
I-3.	Ideal Distribution of Subjects by Age, Socioeconomic Status and Predicted Competence	22
I-4.	Actual Distribution of Subjects by Age, Socioeconomic Status and Predicted Competence	22
II-1.	Testing Schedule	26
II-2.	Criteria for Classifying Two-Year-Old Starters as As, Bs or Cs in Intellectual Competence	32
II-3.	Two-Year-Old Starters: Individual Scores or Rankings on Tests of Intellectual Competence	34
II-4.	Two-Year-Old Starters: Comparison of As and Cs on Tests of General Mental Development	38
II-5.	Two-Year-Old Starters: Comparison of As and Cs on the Development of Language Ability	40
II-6.	Two-Year-Old Starters: Comparison of As and Cs on the Development of Abstract Ability	42
II-7.	Criteria for Classifying One-Year-Old Starters as As, Bs or Cs in Intellectual Competence	44
II-8.	One-Year-Old Starters: Individual Scores or Rankings on Tests of Intellectual Competence	46
II-9.	One-Year-Old Starters: Comparison of As and Cs on Tests of General Mental Development	49
II-10.	One-Year-Old Starters: Comparison of As and Cs on the Development of Language Ability	52
II-11.	One-Year-Old Starters: Comparison of As and Cs on the Development of Abstract Ability	54
III-1.	Interaction Coding System	68
III-2.	Quality of Interaction	75
IV-1.	Present distribution of Subjects on Age When Started, Social Class, Sex and Tested Competence	98
IV-2.	Distribution of Subjects for Data Analysis	98
IV-3.	Distribution of Subjects on Varying Percentages of Observations During Which Mother was the Main Caretaker	101

Table # Name Page

IV-4. Sample Characteristics - Income, Education, Occupation, Ethnicity, Religion, Number of Children in Family . . . 108

IV-5. Two-Year-Old Starters: Comparison of As and Cs on the Intellectual and Social Value of their Interactions with Others - Means . . . 118

IV-6. Two-Year-Old Starters: Comparison of As and Cs on the Intellectual and Social Value of their Interactions with Others - S.Ds and Results of F and T-Tests . . . 119

IV-7. Two-Year-Old Starters: Comparison of As and Cs on Interactions that Differ in Content but are Alike in Intellectual Value - Means . . . 120

IV-8. Two-Year-Old Starters: Comparison of As and Cs on Interactions that Differ in Content but are Alike in Intellectual Value - S.Ds and Results of F and T-Tests . . . 121

IV-9. Two-Year-Old Starters: Comparison of As and Cs on General Types of Techniques Used by Others in Interacting with Them - Means . . . 126

IV-10. Two-Year-Old Starters: Comparison of As and Cs on General Types of Techniques Used by Others in Interacting with Them - S.Ds and Results of F and T-Tests . . . 127

IV-11. Two-Year-Old Starters: Comparison of As and Cs on Specific Techniques Used by Others in Interacting with Them - Means . . . 128

IV-12. Two-Year-Old Starters: Comparison of As and Cs on Specific Techniques Used by Others in Interacting with Them - S.Ds and Results of F and T-Tests . . . 130

IV-13. Two-Year-Old Starters: Comparison of As and Cs on the Intellectual and Social Value of Interactions which are Actively Participated in and Encouraged by Others - Means . . . 134

IV-14. Two-Year-Old Starters: Comparison of As and Cs on the Intellectual and Social Value of Interactions which are Actively Participated in and Encouraged by Others - S.Ds and Results of F and T-Tests . . . 135

IV-15. Two-Year-Old Starters: Comparison of As and Cs on the General Attitude of Others in Interacting with Them - Means . . . 138

IV-16. Two-Year-Old Starters: Comparison of As and Cs on the General Attitude of Others in Interacting with Them - S.Ds and Results of F and T-Tests . . . 139

Table #	Name	Page
IV-17.	Two-Year-Old Starters: Comparison of As and Cs on the Intellectual and Social Value of their Interactions with Others - Means	164
IV-18.	Two-Year-Old Starters: Comparison of As and Cs on the Intellectual and Social Value of their Interactions with Others - S.Ds and Results of F and T-Tests	165
IV-19.	Two-Year-Old Starters: Comparison of As and Cs on the Intellectual Interactions which are Actively Participated in and Encouraged by Others - Means	166
IV-20.	Two-Year-Old Starters: Comparison of As and Cs on the Intellectual Interactions which are Actively Participated in and Encouraged by Others - S.Ds and Results of F and T-Tests.	167
IV-21.	One-Year-Old Starters: Comparisons of As and Cs on the Intellectual and Social Value of their Interactions with Others - Means	170
IV-22.	One-Year-Old Starters: Comparisons of As and Cs on the the Intellectual and Social Value of their Interactions with Others - S.Ds and Results of F and T-Tests	171
IV-23.	One-Year-Old Starters: Comparisons of As and Cs on Interactions that Differ in Content but are Alike in Intellectual Value - Means	172
IV-24.	One-Year-Old Starters: Comparisons of As and Cs on Interactions that Differ in Content but are Alike in Intellectual Value - S.Ds and Results of F and T-Tests	173
IV-25.	One-Year-Old Starters: Comparisons of As and Cs on General Categories of Techniques Used by Others in Interacting with Them - Means	176
IV-26.	One-Year-Old Starters: Comparisons of As and Cs on General Categories of Techniques Used by Others in Interacting with Them - S.Ds and Results of F and T-Tests	177
IV-27.	One-Year-Old Starters: Comparison of As and Cs on the Attitude of Interactors Towards Them - Means.	178
IV-28.	One-Year-Old Starters: Comparison of As and Cs on the Attitude of Interactors Towards Them - S.Ds and Results of F and T-Tests	179
IV-29.	One-Year-Old Starters: Comparison of As and Cs on the Intellectual and Social Value of Interactions that are Actively Participated in and Encouraged by Others - Means	180

Table #	Name	Page
IV-30.	One-Year-Old Starters: Comparison of As and Cs on the Intellectual and Social Value of Interactions that are Actively Participated in and Encouraged by Others - S.Ds and Results of F and T-Tests	181
IV-31.	One-Year-Old Starters: Comparison of As and Cs on Specific Techniques Used by Others in Interacting with Them - Means	182
IV-32.	One-Year-Old Starters: Comparison of As and Cs on Specific Techniques Used by Others in Interacting with Them - S.Ds and Results of F and T-Tests.	184
V-1.	Number of Minutes per Observation Hour Spent by Children of the Case Studies in Various Types of Interaction with their Mothers	193
V-2.	Number of Minutes per Observation Hour Spent by Children of the Case Studies in Various Types of Interaction with All People.	209

LIST OF FIGURES

Figure Page

III-1. Mother and Child Interact in Activities of High, Moderate and Low Intellectual Value. 77

III-2. Mother Uses Techniques of Observation, Restriction and Participation with Verbal/Symbolic Activity 79

III-3. Mother Uses Techniques of Facilitation and Restriction in a Fine Motor/Spatial Activity 80

III-4. Mother Uses Techniques of Observation and Facilitation in an Executive Skill Activity 81

III-5. Mother Uses Participatory Techniques of Teaching, Joining in and Conversation in an Expressive/Creative Activity . . 82

III-6. Father Uses Restrictive Techniques of Prevention, Scolding and Distraction in a Concrete Reasoning Activity . . . 83

III-7. Mother Uses the Non-participatory Techniques of Observation in a Negative Social Activity 84

IV-1. Two-Year-Old Starters: Comparison of Middle-Class As and Working-Class Cs on the Quality of their Interaction with Others 123

IV-2. Two-Year-Old Starters: Comparison of Middle-Class As and Working-Class Cs on the Style of Interaction Used by Others 132

IV-3. Two-Year-Old Starters: Comparison of Middle-Class As and Working-Class Cs on the Quality of Interactions Which Were Actively Participated in by Others 136

IV-4. Two-Year-Old Starters: Comparison of Working-Class As and Cs on the Quality of Their Interaction with Others 144

IV-5. Two-Year-Old Starters : Comparison of Working-Class As and Cs on the Style of Interaction Used With Others. 147

IV-6. Two-Year-Old Starters: Comparison of Working-Class As and Cs on the Quality of Interactions Which Were Actively Participated in by Others 151

IV-7. Two-Year-Old Starters: Comparison of As and Cs on the Quality of Their Interactions with Others 161

IV-8. Two-Year-Old Starters: Comparison of As and Cs on the Style of Interaction Used by Others 162

IV-9. Two-Year-Old Starters: Comparison of As and Cs on the Quality of Interactions Which Were Actively Participated in by Others 163

ENVIRONMENTS OF CHILDHOOD

Chapter I

The Natural Experiment: An Approach to the Scientific Study of Development in Young Children

As early as the age of two or three, striking differences in the intellectual and social competence of children can be observed. What are the causes of these differences? Can they be attributed to dissimilarities in childhood environments and experiences? Or are the causes mostly genetic? Is it even sensible to separate these two factors analytically? These are tantalizing questions to which no one can yet give a satisfactory answer for two very good reasons: we know very little about either the genetic basis of intelligence or about the environments and experiences of childhood considered psychologically.

When we began the research reported here it was sobering for us to realize that there was not a single study in the literature in which the everyday experiences and environments of children in their crucial formative years were directly observed, objectively described, and systematically related to their intellectual or social development. Even in the classic studies addressing the nature-nurture issue with respect to intelligence (e.g. Newman, Freeman and Holzinger, 1937; Shields, 1962; Burt, 1966) which Jensen (1969), Herrnstein (1972) and others have made it fashionable to cite, all the information on childhood experiences were derived from such questionable sources as mothers' reports and adult recollections, while data on environmental factors took the form of sociological classifications of socioeconomic status and cultural group membership or, at best, observers' ratings of the educational and cultural amenities of the home (made after short visits to the home and interviews with parents). It was this dismaying lack of data on variables which psychological theory would consider relevant to development that urged us to undertake a "natural experiment" to investigate the environments and experiences of childhood from a psychological perspective.

The term "natural experiment" captures three important aspects of our research. First, that we studied children in the natural milieu of their homes and neighborhoods rather than in an artificial laboratory setting. Second, that our interest was in the role played in their intellectual and social development by their normal, everyday, cumulative encounters with people, places and things rather than in the effects of extraordinary traumatic events or special experiences contrived by social scientists. And third, that we selected our subjects and organized our data so as to point up a contrast between two groups, much as if we were running a controlled experiment. One of these groups consisted of children who we could anticipate would develop exceptionally well intellectually and socially by the age of three. The other consisted of children who we could predict would develop relatively poorly by age three. Our purpose in selecting and comparing these two groups was to arrive at answers to some simple but fundamental questions. In what way did the experiences of these children differ prior to age three? Was the part played by the environments in these experiences demonstrably different? How were dissimilarities in their environments and experiences related to their divergent development?

History and Organization of The Preschool Project

Before describing in detail the design, methods and findings of our research, a few words must be said about its history and organization. Our research is often referred to as the Preschool Project. This label is fitting if the preschool years are thought to cover the first six years of a child's life before he goes to formal school. However, it is important to distinguish three major phases of Preschool Project research. Phase I -- the phase to which the label "Preschool Project" was originally applied -- began in 1965 and continued until 1969. The major effort of this phase was an observational study directed by Burton L. White[*] of the experiences and competencies of 3-6 year-old children attending preschool. Phase II immediately succeeded Phase I and lasted from the Summer of 1969 to the Fall of 1972. Research in this phase focused on relationships between experience and environment and competence in children age one to three. Two separately funded and independently directed research projects were undertaken, one directed by Burton White, the other by the author. The purpose of White's research in this second phase was to chart the moment to moment experiences of the child from age one to three and to relate these experiences to his development of intellectual and social competence. The purpose of the author's research (which studied the same sample of children as White's) was to describe in detail the part played by the child's human and physical environment in his experiences and to relate this to his development of intellectual and social competence. A third phase of Preschool Project research has recently been undertaken by White. In this phase White plans to carry out an intervention project aimed at structuring the experiences of would-be "average" children so as to maximize their intellectual and social development.

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[*] Credit for research in Phases I and III must be accorded entirely to White since the author was not attached to the Preschool Project during these two phases.

In this report we shall first briefly describe the research of Phase I then present in full the author's research in Phase II. White's research in the second phase will be touched on only incidentally since a full account is available in his report (White, 1972).

Phase I: An Observational Study of Children 3-6 Years Old

The original and abiding long-range aim of the Preschool Project was to learn how "to structure experiences in the first six years of life so as to maximize the child's intellectual and social development and prepare him to profit as much as possible from the formal education system."

To achieve this aim the Preschool Project staff first undertook an intensive investigation into the current state of knowledge about childrearing and child development (see LaCrosse, *et al*., 1970) and then carried out a broad-based observational study of the behavior of children age 3-6 in preschool classrooms (some observations were also carried out in homes). They focused on two questions: What defines competence in the six-year-old? How is it related to the child's previous experiences?

To answer these questions they studied -- as an anthropologist might -- the behavior of children in two contrasting groups. The first group consisted of 3-6-year-olds who their teachers and the Preschool Project staff agreed were developing superbly, both intellectually and socially. The second group consisted of children chosen for the opposite reason -- teachers and staff agreed they were developing poorly although they were clearly normal children. After observing these two groups of children weekly for eight months, the Preschool Project staff then selected the 13 best developed and the 13 least well-developed children and compiled a list of abilities which seemed to distinguish their behavior. They came to two striking conclusions from this comparison. First, that there was little difference in the sensory and motor capacities of children of high and low competence. The major differences were in "cognitive" and social areas. Second, that on many items in their list of distinguishing abilities, similar differences existed between highly-competent *three*-year-olds and less competent *three*-year-olds as between well-developed *six*-year-olds and

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poorly-developed six-year-olds. To put it another way, the qualities that distinguished the outstanding six-year-old were already well in the making by age three. From this conclusion another seemed to follow ineluctably; the influence of experience on the development of competence must be studied prior to age three before any effort to "restructure" children's experiences could be sensibly undertaken. This decision ushered in the second phase of Preschool Project research -- the study of the relationships between experience, environment and competence in children age one to three.

Defining Intellectual and Social Competence in Young Children

An important achievement of the first phase of Preschool Project research was that it provided an answer to the question: what does intellectual and social competence in a 3-6-year old consist of? White's answer was that it consisted of a number of social and non-social abilities which distinguished the everyday behavior of 3-6-year-olds who (in the opinion of teachers and observers) were developing excellently, from others who were developing poorly. White's list of these abilities ran as follows:

Non-Social Abilities

1. Linguistic Competence, including (a) competence in receptive language, (b) competence in expressive language, and (c) competence in grammar.

2. Intellectual Competence, including (a) the ability to sense

dissonance or note discrepancies, (b) the ability to anticipate consequences, (c) the ability to deal with abstractions, e.g., numbers, letters, rules, (d) the ability to take the perspective of another, and (e) the ability to make interesting associations.

3. Executive Abilities, including (a) the ability to plan and carry out multi-stepped activities, (b) the ability to use resources effectively.

4. Attentional Ability, especially the ability to dual focus, i.e., to attend to two things simultaneously or in rapid alternation.

Social Abilities

1. The ability to get and maintain the attention of an adult in socially acceptable ways.

2. The ability to use adults as resources.

3. The ability to express both affection and hostility to adults.

4. The ability to lead and to follow peers.

5. The ability to express both affection and hostility to peers.

6. The ability to compete with peers.

7. The ability to praise oneself or show pride in accomplishment.

8. The ability to involve oneself in adult role-playing behaviors or to otherwise express the desire to grow up.

Having compiled this list of distinguishing abilities of 3-6-year-olds and having at the same time concluded that relationship of experience to competence must be studied prior to age three, White was faced with the problem of defining intellectual and social competence for this younger group of children. He solved this problem by defining competence in terms of the antecedents or early manifestations of the distinguishing abilities isolated in the 3-6-year-old. But defining competence was one thing and finding ways to evaluate it was another. Hence the search for and development of methods for assessing competence in 1-3-year-olds became the first major problem to be tackled before Phase II of Preschool Project Research could be launched. The story and outcome of this effort is described in Chapter II of this report.

Phase II: The Longitudinal "Natural Experiment" on One- to Three-Year-Olds

Design and Sample Characteristics at Recruitment

The principal effort of the second phase of Preschool Project research was a longitudinal "natural experiment" designed to investigate relationships among the child's experience, environment and his development of intellectual and social competence between the ages of one and three. In this experiment two contrasting groups of children were deliberately recruited. One group was composed of children who we could predict would achieve high levels of intellectual and social competence by age three ("A" children), while the other consisted of children who we could expect would develop relatively poorly ("C" children). Once the children were recruited, the idea was to gather extensive observational data on their experiences and environments until they reached age three, and to relate these data -- systematized and "quantified" --

to their intellectual and social development over the same period of time. Each child's intellectual and social progress was to be evaluated by a variety of tests or observational procedures and at age three he would be rated as "A" or "C" on the basis of his actual test performance rather than our initial prediction. The experiences and environments encountered by these "A" and "C" children over the previous two years would then be compared and critical differences isolated. Later research could then subject these critical differences to experimental test to see whether or not they caused divergent development -- a conclusion that a descriptive study may suggest but can never prove.

Predicting Intellectual and Social Competence in One- and Two-Year-Olds for Purposes of Recruitment

In order to be sure that our final contrast groups of A and C children would differ significantly in intellectual and social competence we searched for a method of recruiting children who we could confidently predict would develop either high or low levels of competence by the age of three. We preferred this procedure to obtaining a random sample in which most children would be expected to turn out to be of average competence. But several obstacles lay in the way of our plan. In particular, we knew of no measures which we could use at age one to determine whether a child was on the road to achieving high or low competence. We were certain that the predictive value of any tests we might use would be low because of three considerations:

(1) Between age one and two, equally competent children may mature at very different rates. This is a period in which physical, intellectual, and social abilities, as well as language are undergoing rapid change, and high levels of these different skills are not necessarily acquired in a set sequence.

(2) Children are quite difficult to test during their second year, especially during the period 15-21 months. At this time the child is apt to be unusually shy, stubborn, or fussy, a pattern of behavior often attributed to the newly developing "age of autonomy" when the child has discovered the word "no" and doesn't hesitate to use it. He is no longer the friendly cooperative child of 12-15 months and has not yet reached the stage where sociability and curiosity make him eager to try the little games which the experimenter introduces.

(3) The test performance of young children is profoundly affected by experience with testing, by familiarity with materials similar to those used in the test, by the extent to which the child is used to "performing on demand," and so on. Thus a series of trials with the tests is necessary to establish a young child's true ability. However, we could not test a child too often before we started observing him, since experience with the test sessions themselves was likely to have an effect on how child and mother subsequently behaved when we came to observe them. In more than one case, we discovered that mothers went out and bought toys similar to our test materials and played games with their children remarkably like those in our tests!

These considerations compelled us to find a method of recruiting Subjects who we could predict would achieve high or low competence other than through using actual test scores. We adopted the following plan:

(1) Determine the competence of an older sibling of the Subject.

(2) For recruitment purposes, classify our Subject as possessing high or low competence according to the competence level of his older sibling.

(3) For final data analysis reclassify all subjects at age three according to their actual performance on our periodic tests of intellectual and social competence.

A basic assumption of this plan is that if older children in a family have achieved high or low levels of competence, then younger members of the family are likely to follow in their footsteps and achieve similar levels of competence. We can make this prediction for two obvious reasons: Children of the same parents are genetically similar, and children in the same family are likely to have similar environments.

The fact that we feel fairly confident in predicting a child's competence at age three from a knowledge of the competence level or I.Q. of an older brother or sister does not mean that we believe that intellectual competence or intelligence is largely genetically determined. On the contrary, we expect that the intelligence or competence of an older sibling is as much affected by his early environment as our Subject's, and both children may attain similar levels of competence because of similarities in their genetic inheritance and their early environments.

In any case, the reader should bear in mind that this sibling information was used only for recruitment purposes and interim data analyses. Its value was in enabling us to find a sample of Subjects who we could predict would turn out to be either well above or below average in intellectual and social competence. Classification of Subjects for final data analysis is based on their own demonstrated competence on periodic assessments between ages two and three. Details of test procedures and results will be described in Chapter II.

Methods of Recruiting Subjects

It turned out to be much more difficult than we had expected to locate older children who met our competence criteria and who happened to have younger siblings who were under two. First we searched the elementary schools. We held meetings with personnel of the school systems of three communities in the Greater Boston Area and through their good offices met with the principals of 14 schools with a combined population of 4,500 children. The principals helped us to obtain from teachers and counselors the names of older children who they considered to be either high or low in intellectual and social competence and we sent letters to their families. If the family signified they were interested in participating in our study, we requested permission to examine the school records of their older child who had been recommended by the school. If the school records were consistent with the teacher's recommendations, the child's younger sibling entered our sample. We obtained 11 out of 40 Subjects by this method. This group of school-recommended Subjects was increased to 16 when we added 5 children whose siblings were recommended by nursery school teachers. It was further increased to a total of 21 when we added five children whose older siblings had participated in our previous study of 3-6-year-olds. These older siblings had originally come to us through teacher recommendations and had been rated as high or low in intellectual and social competence by teachers and project staff who observed them over a period of 8 months.

Another major source of Subjects for our study were the files of the National Collaborative Study's Boston Branch. An objective of this study was to chart the intellectual and physical development of a sample of children born at the Boston-Lying-In Hospital. We were permitted to examine the records of about 5,000 of these children age 4-8 and made a list of all those whose I.Q. scores on the WISC were less than 95 or over 115, who lived in the Greater Boston Area, and who we thought might have a younger brother or sister of suitable age. We then contacted parents, and if they had a one- or two-year-old and were willing to have him participate in our study he was recruited. We obtained 12 Subjects by this method.

The remaining seven Subjects in our study were located through a variety of sources. Two were located through responses to our advertisements in local newspapers, one through contact with another research project, two through a search of the files of local Well Baby Clinics. These five subjects were selected from a larger pool of subjects located through the same sources. Each was chosen after competence ratings on an older sibling were made by his teacher and the older sibling was rated as high or low in intellectual and social competence. The remaining two subjects were first and only children who were referred to us by other parents in the study. These two children seemed to us to be clearly developing very well so we admitted them to the study although sibling data were not available.

In summary, our sample consists of 40 children who were recruited by somewhat different methods and who, perhaps, represent somewhat different Subject-pools. A systematic comparison of these methods is given in Table I-1 and I-2 and they may be briefly described as follows:

Method I. Initial teacher recommendation of sibling as A or C using Preschool Project criteria for rating sibling's intellectual and social competence. Twenty-one (52%) of our Subjects were recruited through initial teacher recommendations of an older sibling as an A or C child. In these cases the teacher singled out the older children from all the children in her class as of high or low competence, using as criteria for competence the list of distinguishing abilities of 3-6-year-old As and Cs previously discussed.

Method II. I.Q. test information on sibling substituted for intellectual competence rating; Preschool Project criteria for rating sibling's social competence applied after brief home observation. Twelve or 30% of our Subjects were recruited chiefly on the basis of WISC test information on an older sibling. In this case the criterion of intellectual competence was probably narrower but more objective

Table I-1 Methods and Sources of Recruitment of Subjects

One-Year-Old Starters

Subject ID# Test Performance A	HR SES	Method of Recruitment[a]	Source of Recruitment[b]	Sibling Intellectual Competence			Subjects Intell. Competence Rating[e]	Sibling Social Competence		
				Age at Rating	Rater[c]	Rating[d]		Age at Rating	Rater	Rating
Prediction A										
03	II	I	N-Sch	4	T	A	A	4	T	B
08	II	IV	No	-	-	-	A	-	-	-
11	I	II	Coll	6	IQ(163)	A	A	6	PSP	A
17	I	I	PSP	5	T&PSP	A	A	5	T&PSP	A
19	I	II	Coll	6	IQ(121)	A	A	6	PSP	A
20	II	I	PSP	4	T&PSP	A	A	4	T&PSP	A
24	I	I	Sch	6	T	A	A	6	T	B
16	III	II	Coll	5	IQ(123)	A	A	5	PSP	A
Prediction C										
01	IV	I	PSP	4	T&PSP	C	A	4	T&PSP	C
Test Performance B										
Prediction A										
31	II	I	N-Sch	5	T	A	B	5	T	A
39	III	II	Coll	3	IQ(123)	A	B	3	PSP	A
32	IV	I	PSP	4	T&PSP	A	B	4	T&PSP	A
Prediction C										
06	IV	I	Sch	11	T	C	B	11	T	C
41	IV	III	Clinic	6	T*	C	B	6	T*	C
42	V	III	Clinic	6	T*	C	B	6	T*	C
43	III	I	Sch	9	T	C	B	9	T	C

Test Performance C										
Prediction A										
44	III	III	OR	3	T*	A	C	3	T*	A
Prediction C										
38	V	I	Sch	5	T	C	C	5	T	C
34	IV	II	Coll	7	IQ(86)	C	C	7	PSP	C
45	III	III	Ad	6	T*	C	C	6	T*	C

---

[a] See text for description

[b] Sch=Elementary School, N-Sch=Nursery, Coll=Collaborative Study Files, PSP=Sibling participated in previous Preschool study project, Ad=Response to newspaper advertisement, Clinic=Well Baby Clinic, OR=Files of another Harvard Research Project, No=No sibling

[c] T--Teacher; T-PSP--Teacher made initial recommendation. Preschool Project staff made rating after extensive observation of sibling; PSP--Preschool Project staff made rating after brief observation of sibling. T*--Teacher made rating after Subject recruited. Preschool criteria used but teacher did not initially single out sib as A or C. IQ--WISC IQ information substituted for intellectual competence rating.

[d] Sibling rating is the same as Subject's predicted rating.

[e] S's final classification based on his own test performance. Criteria for classification are described in text.

Table I-2 Methods and Sources of Recruitment of Subjects

Two-Year-Old Starters

Subject ID# Test Performance A	SES	Method of Recruitment[a]	Source of Recruitment[b]	Sibling Intellectual Competence Age at Rating	 Rater[c]	 Rating[d]	Subjects Intell. Competence Rating[e]	Sibling Social Competence Age at Rating	 Rater	 Rating
Prediction A										
02	II	I	N-Sch	4	T	A	A	4	T	A
05	I	I	N-Sch	5	T	A	A	5	T	A
09	I	IV	No	–	–	–	A	–	–	–
10	I	I	Sch	8	T	A	A	8	T	B
12	I	I	Sch	6	T	A	A	6	T	A
13	I	I	N-Sch	5	T	A	A	5	T	A
21	I	I	Sch	5	T	A	A	5	T	A
22	III	II	Coll	5	IQ(143)	A	A	5	PSP	A
35	III	II	Coll	5	IQ(119)	A	A	5	PSP	A
40	III	II	Coll	4	IQ(150)	A	A	4	PSP	A
Prediction C										
25	IV	I	Sch	7	T	C	A	7	T	C
Test Performance B										
Prediction A										
18	III	I	Sch	9	T	A	B	9	T	A
36	III	II	Coll	5	IQ(142)	A	B	5	PSP	A
Prediction C										
33	I	I	Sch	8	T	C	B	8	T	C

Test Performance C										
Prediction A										
37	III	I	Sch	7	T	A	C	7	T	A
Prediction C										
07	IV	II	Coll	5	IQ(83)	C	C	5	PSP	C
14	IV	I	PSP	5	T&PSP	C	C	5	T&PSP	C
27	III	I	Sch	5	T	C	C	5	T	C
28	III	II	Coll	5	IQ(67)	C	C	5	PSP	C
30	III	II	Coll	5	IQ(78)	C	C	5	PSP	C

---

[a] See text for description

[b] Sch=Elementary School, N-Sch=Nursery, Coll=Collaborative Study Files, PSP=Sibling participated in previous Preschool study project, Ad=Response to newspaper advertisement, Clinic=Well Baby Clinic, OR=Files of another Harvard Research Project, No=No sibling

[c] T--Teacher; T-PSP--Teacher made initial recommendation. Preschool Project staff made rating after extensive observation of sibling; PSP--Preschool Project staff made rating after brief observation of sibling. T*--Teacher made rating after Subject recruited. Preschool criteria used but teacher did not initially single out sib as A or C. IQ--WISC IQ information substituted for intellectual competence rating.

[d] Sibling rating is the same as Subject's predicted rating.

[e] S's final classification based on his own test performance. Criteria for classification are described in text.

than that used by teachers in making recommendations. On the other hand, the ratings of social competence were probably less reliable since Preschool Project staff rated the sibling's social competence after only one visit to the home. The subject pool from which this group was drawn was also different, consisting of some 5,000 predominantly working-class children whose siblings had participated in a hospital-sponsored study.

Method III. Subject contacted without information on sibling; teacher ratings of intellectual and social competence of sibling are obtained "after the fact." In the case of seven or 17% of our sample the subject rather than his sibling first came to our attention (through clinic files, response to ads or friends' referrals). We then obtained ratings on the intellectual and social competence of his older sibling from his teacher and if these ratings were A or C we admitted the subject to the study. In this case the criterion for intellectual and social competence of the older sibling is similar to that used in the teacher-recommendation method but the subject-pool may be different. The same teacher might not have singled out the sibling from among all the children in her class had we approached her initially.

It is difficult to say what difference these variations in recruitment procedures makes to our study. We shall simply note that we were obliged to use different forms of recruitment since our first choice -- teacher recommendations -- yielded too small a number of subjects and also an uneven distribution of subjects by competence level and social class.

Social Class of Subjects

Our sample of forty recruits may be grouped by socioeconomic status as well as by predicted competence ratings (A versus C). In terms of the Index of Social Position developed by Hollingshead and Redlich (1958) which employs occupation, education and residence as class criteria, 11 of our Subjects can be considered to be in Class I, 5 in Class II, 14 in Class III, 8 in Class IV, and 2 in Class V. The fathers of children in Classes I and II are nearly all professional men: lawyers, doctors, University professors, scientists and so on. The fathers of children in Class III include an elementary school teacher, a laboratory technician, a city planner, an accountant, two small shop owners, two salesmen and a court officer. The fathers of children in Classes IV and V include a repairman, a truck driver, a bus driver, a steel worker, a baker, a maintenance man, and a soldier. One mother in our sample is head of the household and is supported by ADC.

The education of fathers in these groups is appropriate to their occupations. All fathers of children in Classes I and II have had graduate, professional training while the education of fathers in Classes III, IV and V ranges from college (B.A. degree) to graduation from elementary school. Typically, fathers of Class III have had some college while fathers of Class IV and V have not finished high school.

The family income of children in Classes I and II ranges from about $3,000 (in the case of two university students) to well over $20,000; the median income being about $20,000 per annum. Income for families in Class III is typically between $7,000 and $12,000 per year while income for families in Classes IV and V is more mixed. For four families in Classes IV and V it is between $7,000 and $12,000; for four others it is between $3,000 and $7,000 and for the remaining two families it is under $3,000. Some families in Classes I and II live in large, expensively furnished houses in suburban neighborhoods, while several live in smaller houses or apartments in urban areas near a university. The typical family in Class III lives in a medium-sized, well maintained apartment in an urban location, while the typical family in Classes IV and V lives in a smaller apartment in a similar urban location which is often part of an ethnic neighborhood (in Boston, most often Irish).

Recruiting Predicted A and C Children from Different Social Class Backgrounds

In recruiting Subjects we hoped to find equal numbers of children in both the middle and working classes who we could predict would develop as As or Cs. For us an ideal distribution of Subjects would have been as in Table I-3. However, as we have already mentioned, we encountered great difficulties in meeting these cell quotas, and the actual distribution of Subjects on predicted competence and social class was as shown in Table I-4. This table shows considerable imbalance in our sample at recruitment. Clearly our chief difficulty was in

Table I-3

Ideal Distribution of Subjects by Age, Socio-economic Status and Predicted Competence

	One-Year-Olds		Two-Year-Olds		Total
	A	C	A	C	
Class I, II	6	6	6	6	24
Class III-V	6	6	6	6	24
	12	12	12	12	48

Table I-4

Actual Distribution of Subjects by Age, Socio-economic Status and Predicted Competence

	One-Year-Olds		Two-Year-Olds		Total
	A	C	A	C	
Class I, II	8	0	7	1	16
Class III-V	4	8	6	6	24
	12	8	13	7	40

locating predicted C children in the middle class (Classes I and II in Hollingshead and Redlich's classification). Only 1 out of 15 middle-class recruits was a predicted C while 14 of the 24 working-class Subjects (Classes II, IV, and V in Hollingshead and Redlich's scale) were expected to develop as Cs.

Our difficulties of course did not end with composing the initial sample since the major comparison we wished to make was between "actual" As and Cs, that is between children who had actually demonstrated high or low levels of competence on various tests given between age two and three. It was realistic to expect that some children in the sample would not develop as predicted. Remember, these forecasts were based on the competence levels achieved by one or more older siblings and there are many reasons why the environments and experiences of a younger child (insofar as these influence a child's development) may be quite different from his older brother or sister. The sheer stress on the mother of having an additional child is one factor on the negative side; the mere experience of having already brought up one child is a factor on the positive side. The problem was we had no sure way of anticipating how much our predictions would be in error or whether some groups would be affected more than others. The final composition of our sample in terms of tested competence will be described in the next chapter after we have described the instruments we used to assess the development of competence in our subjects, the findings for individual children, and then the criteria for classifying them as actual As and Cs.

Chapter II

ASSESSING INTELLECTUAL AND SOCIAL COMPETENCE FROM AGE ONE TO THREE

Instruments to Screen Out Handicapped Children

We needed to be confident that the development of competence in our Subjects was not significantly affected by detectable mental or physical abnormalities. Therefore we decided to test for general maturational status, hearing, and vision prior to admitting a subject to our study. We selected the Bayley Scales of Infant Development (1936) for assessing general maturational status and administered it when the prospective one- or two-year-old subject was 12 or 24 months. Any child whose Mental Development Index fell below 75 and for whom the tester judged the test result was a fair indication of his development was excluded from further participation. For vision and hearing we developed two brief procedures which were administered along with the Bayley. Again, any child whose performance indicated a serious handicap was dropped from the study. The possibility of other physical handicaps was gauged by obtaining information from the mother on the child's medical history.

Testing Schedule

The first assessment measures given to the Subjects are the Bayley and the vision and hearing tests.[1] These tests are administered once to each age group, the one-year-old starters at 12 months and the two-year-old starters at 24 months. Three other tests, on language ability, capacity for abstract thinking, and the ability to sense discrepancies, are always administered within a one- or two-week period. This sequence of three tests is begun at 12 months for children studied from age one and is repeated at 15, 21, 24, 27 or 30 months, and 36 months. For two-year-old starters the set of three tests are given at 24, 27, 30 and 36 months. In general the tests are scheduled to come before and after our observation cycles which take place at 12-15, 18-21, 24-27 and 30-33 months for one-year-old starters and at 24-27 and 30-33 months for two-year-old starters. One exception is that we do not test subjects at 18 months because we found from previous experience that the child of this age is too uncooperative and test performance is highly unreliable. Other exceptions are that we test the one-year-old starters at either 27 or 30 months,[2] and no subjects are tested at 33 months. Since the child is changing less rapidly in the third year of life as compared to the second and we also wished to avoid familiarizing the subjects too much with the test items, three tests in the 24-36 months period seemed sufficient. Details of the testing schedule are sketched in Table II-1.

We shall now describe in turn the various methods used to evaluate intellectual and social competence in our sample of children between the ages of one and three. More complete descriptions of these tests, methods of scoring, and reliability findings are to be found in White's report (1972).

Tests of Intellectual Competence

Language Abilities. The test of linguistic competence used in this study deals only with the child's ability to understand language rather than to produce it (receptive language rather than expressive language). Because of the large difference in linguistic abilities between one- and two-year-olds, separate tests were devised for each of these groups.[3]

Table II-1

Testing Schedule

One-Year-Old Starters

Type of Tests

Age at Testing	General Development	Language	Abstract Abilities	Discrepancies
12 months	Bayley Auditory Screening Visual Screening	Vocabulary-PSP Instructions-PSP	Uzgiris-Hunt	PSP[a]
15 months		Vocabulary-PSP Instructions-PSP	Uzgiris-Hunt	PSP
21 months		Ammons-FRPV Grammar-PSP	Meyer's Pacific Series	PSP
24 months	Bayley	Ammons-FRPV Grammar-PSP	Meyer's Pacific Series	PSP
27 months or 30 months[b]		Ammons-FRPV Grammar-PSP	Meyer's Pacific Series	PSP
36 months	Stanford Binet	Ammons-FRPV Grammar-PSP	Meyer's Pacific Series	PSP

Two-Year-Old Starters

Age at Testing	General Development	Language	Abstract Abilities	Discrepancies
24 months	Bayley Auditory Screening Visual Screening	Ammons-FRPV Grammar-PSP	Meyer's Pacific Series	PSP
27 months		Ammons-FRPV Grammar-PSP	Meyer's Pacific Series	PSP
30 months		Ammons-FRPV Grammar-PSP	Meyer's Pacific Series	PSP
36 months	Stanford-Binet	Ammons-FRPV Grammar-PSP	Meyer's Pacific Series	PSP

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[a] The designation PSP indicates that the test items were developed by members of the Preschool Project Staff.

[b] Six of the 20 one-year-old starters were tested at 27 months, and 14 were tested at 30 months. The reason for changing the test schedule was a practical one. Difficulties in recruiting subjects made it impossible for us to study the later recruits after they reached age 27 months, whereas the earliest recruits could be studied until age 36 months. The 27 months test scores for Ss tested at 30 months were estimated by averaging their 24 months and 30 months scores.

The test designed for one-year-olds assesses the child's understanding of simple names for objects and simple instructions and is conducted in an informal manner with the mother doing the testing. The simplest level of the test requires the tester to gather together five or six objects which the mother says are familiar to the child (e.g. bottle, blanket, a favorite toy, a sister, a pet). The mother then asks the child, "where is your cup?", "find the kitty" etc. At the next stage, the child is asked to find several less familiar objects which the tester brings along with her such as a ball, spoon, pencil, toothbrush, eyeglasses, and keys. For the most advanced stage, the task is to identify classes of the same unfamiliar items: "where is the ball; can you find another ball?" For these items, the tester has two samples of each object, e.g. a small, red ball and a large, blue ball. Again, the task is for the child to indicate an understanding of the class label.

The second part of the test deals with the comprehension of instructions. Here too, there are three levels of difficulty appropriate to different ages and abilities. The simplest is a one-step familiar instruction such as "wave bye-bye, come here; sit down, kiss me." The next most difficult type of instruction is also one with which the child is familiar (according to mother), but which requires a sequence of behavior. For example, "bring me the keys," "turn off the light," etc. The child must know what keys are and also how to get them and bring them to mother. The most difficult type of instruction is the unfamiliar sequence involving familiar elements. Some examples are "put the diaper under the table," "take the keys up the stairs."

The language test for children twenty-one to thirty-six months of age can also be given by the mother, but at this age, many children enjoy the novelty of a stranger as long as mother is close at hand. Often the child prefers sitting on mother's lap. This test consists of two parts, vocabulary and grammar, and also assesses receptive rather than expressive language. The vocabulary items are taken from the Ammons Full-Range Picture Vocabulary Test (1949) and consist of a set of cards, each with four different pictures printed on it. One card is held up before the child and he is asked to point first to the "horse," and then to the "wagon." (The 4 pictures on this card are of a bird, a dog, a horse pulling a wagon, and an insect.) The words vary in difficulty and sometimes may be guessed by the process of elimination.

The second part of this test is an assessment of the child's understanding of grammar. The child is asked to act out a number of phrases with materials the experimenter provides (balls, cups, etc.). The grammar items range from the simplest prepositional relationships, e.g., "put the ball _in_ the cup; take the ball _out_ of the cup; where's your _head_; where's _my_ head" to such complex verbal and plural forms as "show me how the _doll_ _walks_; show me how the _dolls_ _walk_," and "give me a stick which is _longer_ _and_ _thinner_ than this one." These grammar items are based on studies by Ursula Bellugi-Klima on the grammatical development of very young children (1968).

Abstract _Abilities_. The capacity for Abstract thought is clearly very limited in children under three, so the focus of our assessment is on the antecedents of this ability rather than the ability itself. Following Piaget (1952) we assume that the processes of sensori-motor intelligence that develop during the first two years of life are the foundations of the child's ability to deal with abstractions, so it seemed sensible to find tests that would measure the development of these processes. After considerable search the tests we finally employed were the Uzgiris-Hunt Scales for Object Permanence and Spatial Relations (1964) and a test composed of form and color matching and of pattern and picture completion items culled from the Pacific Tests of Intellectual Ability (Meyers, 1964). The Uzgiris-Hunt test is given to children in the 12-21 month period while the other test is administered during the 21-36 month period.

The Ability to Sense Dissonance. One way of describing this form of competence is to say that children with this skill are acute observers. They notice when something is "different" or "wrong" in a visual display, for example, a sketch of the moon with hair, or the new haircut of a peer. They are quick to notice when a sequence of events has not gone as it should; for example, when another child has gone out of turn in a group game. They notice inconsistencies in abstract realms; when, for example, an adult tells a story with elements of nonsense, or when an error has been committed in spoken simple arithmetic exercises.

The test devised to measure this aspect of competence consists of a two-choice situation. A reward, usually a piece of marshmallow, a raisin, or cereal, is hidden in view of the child under one of two cups. For the youngest children the cups vary in size, shape, and color. For older children the cups have different line drawings of squares, circles, etc., the differences becoming increasingly more difficult to detect. The child's task in all cases is to indicate, after a short delay, the cup under which the reward is hidden.

General Development and Intelligence Tests. All Subjects are tested for general development at 12 and 24 months with the Bayley Scales of

Infant Development and at 36 months with the Stanford-Binet.

Evaluation of Social Competence

The eight Social Abilities listed in the Introduction are evaluated by means of a 27-item Social Competence check list developed by Ogilvie and Shapiro (see White, 1972) especially for use in this project. This check list is an observational instrument rather than a test. Each Subject is observed for half an hour in his home five times in each of two or four cycles of observation (12-15, 18-21, 24-27, and 30-36 months) depending on whether he started at age one or two. A check mark is entered on a coding sheet whenever a particular type of social interaction takes place between the child and another person. For example, each time the child tries to get the attention of an adult (say, by moving towards him, touching, or calling to him) a check mark is entered, and the total number of check marks for each category is summed over the five observation periods. The 27 different types of social behavior are grouped into eight social abilities and a score for each of these abilities is computed after assigning various weights to the component items. Overall scores for social competence towards adults, social competence towards peers, and social competence towards both adults and peers is calculated by summing scores for the eight social abilities. The weights and procedures used in arriving at these scores are described in White (1972).

Tested Versus Predicted Competence: Implications for Study Design

At the time of this writing, the tested competence levels of the 20 Subjects who started in our study at age 12 months still cannot be established since they are now barely 30 months old. All of these incomplete Subjects are from the working class. This means that although we shall present their test performance data from age 12 to 27 months and we shall use these data to form tentative groups of working-class As and Cs, comparison of these groups on the dependent variable must be made with the greatest caution since their composition is highly likely to change as future test results become available.

These considerations do not apply to the twenty Subjects who were two-years-old when they entered our study all of whom have completed the test series. Therefore, throughout this report the two-year-old starters will be treated as an entirely separate sample from the one-year-old starters and they shall be the focus of most of our attention since their results can be regarded as final. Information on the one-year-old starters will be discussed only briefly because the analysis of their data is premature and it would be futile to spend much time dissecting data which may soon become obsolete.

Two-Year-Old Starters

Tested Intellectual Competence

How did individual two-year-old starters who we had predicted would develop as As or Cs actually fare on the tests of intellectual competence? To answer this question we must first establish some quantitative criteria for intellectual "A"-ness and "C"-ness at age three. These criteria are given in Table II-2 and simply represent our best judgment as to where the cutoff point should fall given the size and composition of the initial sample.

Table II-2

Criteria for Classifying Two-Year-Old Starters as As, Bs, or Cs in Intellectual Competence

Stanford Binet at 36 months.	A: IQ 115 or more C: IQ 100 or less
Language Tests at 24, 30, 36 months.	A: Average of three ranks is 10 or higher C: Average of three ranks is 14.5 or lower
Abstract Abilities at 24, 30, 36 months.	A: Average of three ranks is 10 or higher C: Average of three ranks is 14.5 or lower
All Tests:	A: must have reached A level on at least two of the three types of tests. C: must have reached C level on at least two of the three types of tests. B: Subject does not fulfill criteria for Aness or Cness.

Turn now to Table II-3 which lists the test scores for individual two-year-old starters on the Bayley and Stanford Binet, their ranks on the Language and Abstract Abilities Tests, and their predicted and "tested" intellectual competence rating based on the criteria of Table II-2. It seems we were fairly successful in our predictions of competence for the two-year-old recruits. The table indicates that we were correct in 75% of our forecasts (10 predicted As tested as As, 5 predicted Cs tested as Cs). Ten percent of our predictions were incorrect (1 predicted A tested as a C, while 1 predicted C tested as an A), and 15% were questionable (two predicted As and one predicted C tested as Bs).

Social Competence Evaluations

Strictly speaking, a child should be considered as an A or C only if he simultaneously meets the criteria for intellectual and social A-ness or C-ness. Social Competence in this study was evaluated by means of a Social Competence Check List described in the previous section. However, over the course of this study this author has come to have serious reservations about regarding the Social Competence Check List as a measure of social competence rather than as a measure of social experience or social style. These reservations stem from the fact that the check list evaluates the child's social abilities in terms of the number of times he emits certain types of behaviors towards other people while being observed. It seems very likely that these data will be much influenced by the accessibility of other people to the child during the observation period. If adults are not there he cannot try to use them as a resource, for example; if another child is not present he cannot try to lead or follow him. Unfortunately, in the present data, there is no simple way of correcting this fundamental difficulty without creating others.

Table II-3

Two-Year-Old Starters: Individual Scores or Ranks on Tests of Intellectual Competence

				General Development			Abstract Abilities					
Subject #s	Sex	HR SES	Social Class	Bayley 24 mo	Binet 36 mo^a	Rating	24 mo^a	Meyer's 27 mo	Pacific 30 mo^a	36 mo^a	$\bar{X}^b$ Rank	Rating
Test Performance A												
Prediction A												
02	M	II	MC	137	140	A	1	1	2	5	2.7	A
05	M	I	MC	97	142	A	10.5	6	7.5	9.5	9.2	A
09	F	I	MC	104	150	A	8.5	8	4.5	12	8.3	A
10	F	I	MC	106	135	A	12	4.5	7.5	5	8.2	A
12	M	I	MC	102	133	A	10.5	7	4.5	5	6.7	A
13	M	I	MC	102	128	A	6.5	12	12	9.5	9.3	A
21	M	I	MC	111	138	A	3	3	6	1	3.3	A
22	F	III	WC	140	145	A	3	4.5	3	2	2.7	A
35	F	III	WC	104	143	A	3	2	1	5	3	A
40	M	III	WC	104	118	A	6.5	16	9	9.5	8.3	A
Prediction C												
25	M	IV	WC	84	125	A	8.5	11	11	16	11.8	B
Test Performance B												
Prediction A												
18	F	III	WC	100	116	A	13	13	14	5	10.7	B
36	M	III	WC	119	101	B	5	9	10	15	10	A
Prediction C												
33	M	I	MC	89	131	A	20	19	16	13	16.3	C
Test Performance C												
Prediction A												
37	M	III	WC	94	106	B	17	10	17	9.5	14.5	C
Prediction C												
07	M	IV	WC	73	85	C	15	14.5	20	20	18.3	C
14	M	IV	WC	86	92	C	14	17	18.5	19	17.2	C
27	M	III	WC	84	99	C	19	20	13	14	15.3	C
28	F	III	WC	94	99	C	16	14.5	18.5	18	17.5	C
30	F	III	WC	77	92	C	18	18	15	17	16.7	C

		Language				$\bar{X}$[b]		
	Subject #s	24 mo[a]	27 mo	30 mo[a]	36 mo[a]	Rank	Rating	Overall Rating
Test Performance A								
Prediction A								
	02	4	1	3	1	2.7	A	A
	05	1.5	2	1	4	2.2	A	A
	09	10	9	5.5	6.5	7.3	A	A
	10	12	5	5.5	6.5	8	A	A
	12	6	8	10	8	8	A	A
	13	7	7	11	10.5	9.5	A	A
	21	5	3	3	3	3.7	A	A
	22	1.5	4	3	2	2.2	A	A
	35	3	6	7	5	5	A	A
	40	13	11	8.5	10.5	10.7	B	A
Prediction C								
	25	8	13	12	9	9.7	A	A
Test Performance B								
Prediction A								
	18	20	16	20	17	19	C	B+
	36	10	11	14	18	14	B	B+
Prediction C								
	33	16	18	13	14	14.3	B	B+
Test Performance C								
Prediction A								
	37	19	16	15	20	17.7	C	C
Prediction C								
	07	14	19	19	19	17.3	C	C
	14	10	11	8.5	13	10.5	C	C
	27	17	16	16.5	12	15.2	C	C
	28	18	14	16.5	15	16.5	C	C
	30	15	20	18	16	16.3	C	C

---

[a] Rankings on these tests were used to classify subjects on test performance

[b] Means of rankings at 24, 30 and 36 months.

Therefore, our decision is to classify a child as an A or C only in terms of intellectual competence, using the criteria previously given.

Grouping the Sample for Data Analysis in the Light of Tested Competence Levels

The design of our study calls for a contrast between two groups of Subjects, one group consisting of children who have achieved a high level of competence, the other consisting of children who have attained a relatively low level of competence. The simplest way of implementing this design from the present sample would be to drop from the study all Subjects who tested as Bs and retain only those who tested as As or Cs. Another solution would be to group the Bs with the As and contrast this A-B group to that of the Cs. The latter design has the disadvantage that less extreme groups would be compared, hence differences in their experiences may not be so dramatic. However, there is a considerable advantage to increasing and balancing cell sizes for the analysis of variance, so this is the solution we chose. Thus, throughout this paper the two-year-old sample is divided into three comparison groups: middle-class As (seven As and one B), working-class As (four As and two Bs), and working-class Cs (six Cs). The A groups contain Subjects who are not strictly As, but for the sake of brevity we shall label them all as As and hope that the reader will remember that they are not quite the pure groups we had originally envisioned.

Comparison of Groups on Tested Intellectual Competence

It may be tautologous to state that the two A groups surpass the C group in intellectual competence, yet the specifics of the test results are crucial to the design of the study since, in order to put our hypotheses regarding differences in early experiences to proper test we must demonstrate two prerequisites in the test results:

1. Middle-Class As and Working-Class As are alike in intellectual competence.

2. Middle-Class As and Working-Class As are both significantly superior to Working-Class Cs in intellectual competence.

So let us examine the test results in detail.

General Mental Development. The two-year-old starters received the Bayley Developmental Test at 24 months and the Stanford Binet at 36 months. The results for these tests are given in Table II-4. The table shows that the general mental development of the middle-class As (MA) and working-class As (WA) is very similar at 24 months when they enter the study, and both groups are already more advanced than the working-class Cs (WC). Bayley Mental score: MA versus WC; 106 versus 84.7; $t=3.5$; $p<.01$; WA versus WC; 108.5 versus 84.7; $t=2.8$; $p<.05$. At 36 months their scores on the Stanford Binet further confirm their designation as A and C. The average IQ for the middle-class As is 137.1, for the working-class As it is 124.7, and for the working-class Cs it is 95.5. The means for the two A groups are not significantly different ($t=1.7$) while the means for the two pairs of A and C groups unquestionably are (MA versus WC; $t=10.7$; $p<.01$; WA versus WC; $t=3.9$; $p<.01$).

Language Development. The results for the two sets of tests of Receptive Language, the Ammons Free Range Picture Vocabulary and the test of grammar comprehension developed by our staff also provide a clear cut contrast between the A and C groups. At each of the four test points, 24, 27, 30 and 36 months, the means of the two A groups are highly

Table II-4

Two-Year-Old Starters: Comparison of As and Cs on Tests of General Mental Development

Means and Standard Deviations

	Middle-Class A		Working-Class A		Working-Class C	
	Age at Testing (months)		Age at Testing (months)		Age at Testing (months)	
Test	24[a]	36[b]	24	36	24	36
Bayley[a] or Stanford-Binet[b] N=	8	8	6	6	6	6
Mean	106.0	137.1	108.5	124.7	84.7	95.5
s.d.	13.2	6.5	17.4	15.4	7.9	6.7

Results of T-Tests

	MA vs WA[c]		MA vs WC		WA vs WC	
	Age at Testing (months)		Age at Testing (months)		Age at Testing (months)	
Test	24[a]	36[b]	24	36	24	36
Bayley[a] or Stanford-Binet[b]						
t[d]	0.3[d]	1.7	3.5***	10.7***	2.8**	3.9***
df	11	9	10	12	7	7

[a] Score for Bayley Mental Development Index, test administered at age 24 months

[b] Stanford-Binet IQ test administered at age 36 months

[c] MA=middle class, WA=working class, WC=working class, according to Hollingshead and Redlich.

[d] * = $p < .10$, ** = $p < .05$, *** = $p < .01$. The p values are for two-tailed tests.

similar and both are significantly different from that of the working-class Cs. The relative status of the three groups is vividly conveyed by Table II-5.

Development of Abstract Abilities. Among the two-year-old starters the development of Abstract Abilities is assessed at 24, 27, 30 and 36 months by means of three tests, Form and Color Matching, Pattern Completion, and Picture Completion. These results also show substantial differences between the A and C groups. At each test point the means for the middle-class and working-class As are very similar and both means, with occasional exceptions, are significantly higher than that for the working-class Cs. The exceptions to this fairly regular pattern occur for the Form Color test at 36 months and for the Pattern Completion test at 27 and 36 months where no significant difference is found between the working-class As and Cs. It is hard to know what to make of these occasional exceptions: perhaps the most plausible explanation lies in the imperfect construction of the rather ad hoc tests which allow sudden leaps in scores at certain points instead of gradual steady increases over the entire test period. (See Table II-6)

Suitability of Two-Year-Old Starters for Testing Hypotheses

In conclusion, we might summarize the test results by saying that they have supplied us with exactly the groups that we need to test our hypotheses concerning the differences in early environments and experiences. The tested intellectual competence of the working-class A group is very similar to that of the middle-class A group, and significantly higher than that of the working-class Cs in the vast majority of comparisons of their test results. Similarly, the overlap in competence scores between the two A groups is always considerable while the

Table II-5

Two-Year-Old Starters: Comparison of As and Cs on Development of Language Ability

Means and Standard Deviations

	Middle-Class A				Working-Class A				Working-Class C			
	Age at Testing (months)				Age at Testing (months)				Age at Testing (months)			
Test	24	27	30	36	24	27	30	36	24	27	30	36
Ammons FRPV N=	8	8	8	8	5	6	5	6	6	6	6	6
Mean	11.6	15.0	18.0	18.4	12.2	14.0	15.6	17.3	4.3	8.8	9.8	13.2
s.d.	4.7	5.3	1.9	2.6	3.1	1.8	2.9	3.1	4.3	4.7	4.0	1.7
Grammar N=	8	8	8	8	5	6	5	6	6	6	6	6
Mean	9.9	14.6	15.4	19.0	10.4	11.8	15.0	16.8	4.7	6.8	10.0	14.2
s.d.	2.4	3.4	3.0	1.7	2.5	4.0	2.6	2.6	2.2	2.4	3.3	1.7

Results of T-Tests

	MA vs WA[a]				MA vs WC				WA vs WC			
	Age at Testing (months)				Age at Testing (months)				Age at Testing (months)			
Test	24	27	30	36	24	27	30	36	24	27	30	36
Ammons FRPV												
t[b]	0.2	0.5	1.5	0.6	2.8**	2.1*	4.3***	4.2***	3.2**	2.3*	2.5**	2.7**
df	9	7	10	12	12	12	9	10	8	6	8	8
Grammar												
t	0.3	1.3	0.2	1.6	3.9***	4.6***	2.9**	4.9***	3.6***	2.4**	2.5**	1.9*
df	11	12	11	11	12	11	12	12	9	8	9	9

[a] MA=middle class, WA=working class, WC=working class, according to Hollingshead and Redlich.

[b] * = p .10, ** = p .05, *** = p .01. The p values are for two-tailed tests.

overlap between the working-class As and Cs is usually minimal. This particular set of test results permits us to make the following comparisons and interpretations:

1. Middle-Class As versus Working-Class Cs. Differences in experience/environment between these groups are related to differences in social class or competence or both.
2. Working-Class As versus Working-Class Cs. Differences in experience/environment between these groups are related to differences in competence chiefly.
3. Middle-Class As versus Working-Class As. Differences in experience/environment between these groups are related to differences in social class chiefly.

One-Year-Old-Starters

Tested Intellectual Competence

As we have mentioned, many of the one-year-old starters have not yet completed the series of criterion tests of intellectual competence. In the interim, the most we can do is to use the test data that is available to classify them tentatively as As, Bs, or Cs, to form subgroups of middle-class As, working-class As, and working-class Cs analogous to those formed among the two-year-old starters.

We begin by setting down criteria for A-ness and C-ness in Table II-7 and then listing in Table II-8 the test scores for individual Subjects on the Bayley at 12 and 24 months, their ranks on the Language and Abstract Abilities tests, and their predicted and "tested" intellectual competence ratings based on the criteria of Table II-7. Table II-8 suggests that many

Table II-6

Two-Year-Old Starters: Comparison of As and Cs on Development of Abstract Ability

Means and Standard Deviations

	Middle-Class A				Working-Class A				Working-Class C			
	Age at Testing (months)				Age at Testing (months)				Age at Testing (months)			
Test	24	27	30	36	24	27	30	36	24	27	30	36
Form-Color N=	8	8	8	8	6	6	6	6	6	6	6	6
Mean	8.3	9.4	9.8	13.9	10.7	8.5	10.7	12.0	3.8	1.7	3.0	9.2
s.d.	4.9	5.6	4.5	0.3	3.5	4.7	3.7	2.9	3.6	1.8	3.3	4.1
Pattern Completion N=	8	8	8	8	6	6	6	6	6	6	6	6
Mean	8.9	11.4	11.8	13.0	10.0	9.8	10.0	12.7	5.7	9.2	6.3	10.8
s.d.	2.7	1.5	1.3	0.0	1.9	1.8	2.5	0.5	1.1	2.5	2.5	2.2

Results of T-Tests

	MA vs WA[a]				MA vs WC				WA vs WC			
	Age At Testing (months)				Age at Testing (months)				Age at Testing (months)			
Test	24	27	30	36	24	27	30	36	24	27	30	36
Form-Color												
t[b]	1.0	0.3	0.4	1.5	1.8*	3.4**	3.0**	2.6**	3.0**	3.1**	3.5***	1.3
df	11	12	12	7	11	6	11	7	10	6	10	9
Pattern Completion												
t	0.9	1.6	1.5	1.6	2.9**	1.8***	4.4***	2.2*	4.4***	0.5	2.3**	1.8
df	11	12	10	7	7	10	9	7	8	9	10	5

[a] MA=middle class, WA= working class, WC=working class, according to Hollingshead and Redlich.

[b] * = $p < .10$, ** = $p < .05$, *** = $p < .01$. The p values are for two-tailed tests.

Table II-6 (cont.)

Two-Year-Old Starters: Comparison of As and Cs on Development of Abstract Abilities

Means and Standard Deviations

	Middle-Class A Age at Testing (months)				Working-Class A Age at Testing (months)				Working-Class C Age at Testing (months)			
Test	24	27	30	36	24	27	30	36	24	27	30	36
Picture Completion N=	8	8	8	8	6	6	6	6	6	6	6	6
Mean	8.5	10.1	11.4	14.3	9.8	10.5	11.2	14.3	4.3	7.0	7.5	11.8
s.d.	3.1	3.2	1.8	1.5	2.5	1.9	2.8	1.3	2.6	2.8	2.9	1.2
Total Score N=	8	8	8	8	6	6	6	6	6	6	6	6
Mean	25.6	30.9	32.9	41.1	30.5	28.8	31.8	39.0	13.8	17.8	16.8	31.8
s.d.	9.3	8.7	6.4	1.5	6.3	7.7	6.3	4.3	3.2	5.2	4.7	6.2

Results of T-Tests

	MA vs WA[a] Age at Testing (months)				MA vs WC Age at Testing (months)				WA vs WC Age at Testing (months)			
Test	24	27	30	36	24	27	30	36	24	27	30	36
Picture Completion												
t [b]	0.8	0.3	0.1	0.1	2.5**	1.8*	2.6**	3.1***	3.4***	2.3**	2.0*	3.2***
df	12	10	10	12	12	12	10	12	10	9	10	10
Total Score												
t	1.1	0.4	0.3	1.1	3.1**	3.2***	5.0***	3.3**	5.3***	2.6**	4.3***	2.1*
df	10	12	12	8	7	10	11	8	7	9	9	9

[a] MA=middle class, WA=working class, WC=working class, according to Hollingshead and Redlich.

[b] * = $p < .10$, ** = $p < .05$, *** = $p < .01$. The p values are for two-tailed tests.

of our predictions are in error. However, since the tested ratings for some of these discrepant Subjects are not their final ratings, it is premature to make much of the difference between predictions and test results. Rather, the discrepancy should be taken as a warning that the composition of our groups of working-class As and Cs are susceptible to change when future test results are available and current results concerning them must be "taken with a grain of salt."

Table II-7

One-Year-Old Starters as As, Bs, or Cs in Criteria for Classifying Intellectual Competence

One-Year-Old Starters

Bayley Test at 24 months.	A: Mental Development Age 115 or more C: Mental Development Age 100 or less
Language Tests at 21, 24 and 27 months.	A: Average of three ranks is 10 or higher C: Average of three ranks is 14.5 or lower
Abstract Abilities at 21, 24 and 27 months.	A: Average of three ranks is 10 or higher C: Average of three ranks is 14.5 or lower
All Tests:	A: must have reached A level on at least two of the three types of tests. C: must have reached C level on at least two of the three types of tests. B: Subject does not fulfill criteria for A ness or C ness.

Grouping the Sample for Data Analysis in the Light of Tested Competence Levels

We found it necessary among the two-year-old starters to combine a few B Subjects with the As in order to increase and balance cell sizes for the analysis of variance. So, too, with the one-year-old starters. But the situation with these Subjects is more troublesome since 6 of the 12 working-class Subjects test as Bs in their overall intellectual competence ratings, 3 test as Bs on the Bayley test at 24 months taken alone, and there is considerable overlap in scores on individual tests between the working-class As and the working-class Cs. We have adopted the solution of grouping the higher ranking Bs with the As and the lower ranking Bs with the Cs in order to have subgroups of comparable sizes, to wit: middle-class As (7 As and 1 B); working-class As (2 As and 4 Bs); and working-class Cs (2 Bs and 4 Cs). But we must stress as strongly as we can that among these one-year-old starters, the competence levels of the working-class As and working-class Cs are not likely to differ as much as they did among the two-year-old starters. Consequently, these groups of one-year-old starters cannot be made a proper test of our hypotheses on differences in early experience especially since their membership is also likely to change within the lifetime of this project as future test results become available.

Comparison of Groups on Tested Intellectual Competence

Let us now briefly report the standing of the groups on the various tests.

General Mental Development. Table II-9 shows that there were no significant differences among the one-year-old starters on the Bayley Test of Mental Development when they entered our study at 12 months. The mean for the middle-class As, working-class As, and working-class Cs are 110, 107, and 97 respectively, which suggests that differences may be already in the making, but at this point they are far from statistically significant. (MA versus WC; t=1.2; WA versus WC; t=.8). One year later, however, the differences between As and Cs have become much more marked and are highly significant (MA versus WC;

Table II-8

One-Year-Old Starters: Individual Scores or Ranks on Tests of Intellectual Competence

				General Development				Abstract Abilities							
				Bayley				Uzgiris-Hunt			Meyer's Pacific				
Subject #s	Sex	HR	Social Class	12 mo	24 mo^a	Binet 36 mo	Classification	12 mo	15 mo	21 mo^a	24 mo^a	27 mo^a	30 mo	36 mo	$\bar{X}^b$ Rank
Test Performance A															
Prediction A															
03	F	II	MC	102	143	150	A		16	2.5	3	3^c	4	8	2.8
08	M	II	MC	106	123	150	A		6	5.5	8.5	9.5	5.5	6	7.8
11	F	I	MC	119	119	155	A		1	1	4	5^c	5.5	2.5	3.3
17	F	I	MC	100	137	150	A		5	9	1	1^c	2	9	3.9
19	F	I	MC	102	127	131	A		9.5	13.5	6.5	9.5^c	7.5	2.5	9.8
20	F	II	MC	134	132	153	A		13	4	5	4^c	2	2.5	4.3
24	M	I	MC	107	116	128	A		13	7.5	10	13^c	9.5	2.5	10.2
16	M	III	WC	102	127	138	A		9.5	2.5	2	2^c	2	6	2.2
Prediction C															
01	F	IV	WC	134	112	118	B		3	10.5	6.5	11.5^c	9.5	7	9.5
Test Performance B															
Prediction A															
31	M	II	MC	112	108	125	B		3	7.5	16	16^c	11	-	13.2
39	F	III	WC	103	132	-	A		7	17	17	18^d	13^a	-	17.1
32	M	IV	WC	94	108	104	B		3	20	8.5	11.5^c	7.5	-	13.3
Prediction C															
06	F	IV	WC	89	115	-	A		18	15	14.5	-	-	-	14.8^e
41	F	IV	WC	122	106	-	B		8	5.5	11	15^d	12^d	-	10.5
42	F	V	WC	98	91	-	C		13	13.5	12	7^d	-	-	10.8
43	M	III	WC	97	115	-	A		19	18.5	19	14^d	-	-	17.2
Test Performance C															
Prediction A															
44	F	III	WC	125	96	-	C		13	18.5	14.5	7^d	-	-	13.3
Prediction C															
38	M	V	WC	50	84	-	C		17	10.5	18	17^c	-	-	15.2
34	M	IV	WC	109	66	-	C		20	16	20	19^c	-	-	18.3
45	M	III	WC	103	94	-	C		13	12	13	7^d	-	-	10.7

Subject #s	Classification	Language 12 mo	15 mo	21 mo[a]	24 mo[a]	27 mo[a]	30 mo	36 mo	$\bar{X}^b$ Rank	Classification	Overall Classification
Test Performance A											
Prediction A											
03	A		10.5	3	1	1[c]	3	6.5	1.7	A	A
08	A		1.5	4	6	3.5[c]	3	2	4.5	A	A
11	A		3.5	2	2	2[c]	1	1	2	A	A
17	A		17.5	6	6	5[c]	5	4	5.7	A	A
19	A		10.5	5	8.5	8[c]	7	6.5	7.2	A	A
20	A		1.5	1	6	3.5[c]	3	3	3.5	A	A
24	B		5.5	9	8.5	9[c]	8	5	8.8	A	A
16	A		5.5	7.5	3	6[c]	6	-	5.5	A	A
Prediction C											
01	A		3.5	7.5	4	7[c]	-	8	6.2	A	A
Test Performance B											
Prediction A											
31	B		10.5	16	17	14[c]	10	-	15.7	C	B+
39	C		15.5	10	10.5	10[d]	10[a]	-	10.2	B	B+
32	B		10.5	15	12	13[c]	10	-	13.3	B	B+
Prediction C											
06	C		10.5	12	10.5	-	-	-	11.3[e]	B	B+
41	B		10.5	18	15	12[d]	12[d]	-	15	C	B+
42	B		10.5	12	15	11[d]	-	-	12.7	B	B-
43	C		17.5	12	13	16[d]	-	-	13.7	B	B-
Test Performance C											
Prediction A											
44	B		15.5	17	20	19[d]	-	-	18.7	C	C
Prediction C											
38	C		19.5	19	18	17[c]	-	-	18	C	C
34	C		19.5	20	19	18[c]	13	-	19	C	C
45	B		10.5	14	15	15[d]	-	-	14.7	C	C

Footnotes for Table II-8

[a] Rankings on these tests were used to classify subjects on test performance

[b] Means of rankings at 21, 24, and 27 months

[c] Rankings based on average of 24 month and 30 month test scores

[d] Rankings based on score at 27 months

[e] Mean of rankings at 21 and 24 months

Table II-9

One-Year-Old Starters: Comparison of As and Cs on Tests of General Mental Development

Means and Standard Deviations

	Middle-Class A			Working-Class A			Working-Class C		
	Age at Testing (months)			Age at Testing (months)			Age at Testing (months)		
Test	12[a]	24[a]	36[b]	12	24	36	12	24	36
Bayley[a] or Stanford-Binet[b] N=	8	8	8	6	6	3	6	6	0
Mean	110.3	125.6	142.8	107.3	115.7	120.0	97.0	90.0	-
s.d.	10.7	10.8	11.6	15.7	10.0	14.0	23.0	13.1	-

Results of T-Tests

	MA vs WA[d]			MA vs WC			WA vs WC		
	Age at Testing (months)			Age at Testing (months)			Age at Testing (months)		
Test	12	24	36	12	24	36	12	24	36
Bayley[a] or Stanford-Binet[b]									
t[c]	0.4	1.6	2.1**	1.2	5.0***	-	0.8	3.5***	-
df	11	12	9	9	12	-	9	9	-

[a] Score for Bayley Mental Development Index; test administered at age 12 and 24 months.

[b] Stanford Binet IQ test administered at age 36 months.

[c] *p .10, **p .05, ***p .01 . The p values are for two-tailed t-tests.

[d] MA=middle class, WA=working class, WC=working class, according to Hollingshead and Redlich.

t=5.0; $p < .01$; WA versus WC; t=3.5; $p < .01$). However, it is important to note that at 24 months there is also a substantial difference in Bayley scores between the middle-class As and working-class As (125.6 versus 115.7; t=1.6) reflecting the fact that 50% (3/6) of the children in the latter group have IQs between 100-115 while all of the middle-class As have IQs above 115.

Language Development. In contrast to the results for the test of general development, the Language tests indicate that there were significant differences between the As and Cs when they first entered the study. At 12 months, the averages for the two A groups on our home-made tests of comprehension of vocabulary and verbal instructions were very close and both means were significantly higher than for the working-class Cs (MA versus WA; 15.1 versus 15.7; t=.4)(WA versus WC; 15.7 versus 12.00; t=3.5; $p < .01$). Similar results for the groups are found when this test is given again at 15 months. (See Table II-10)

These home-made tests of grammar and vocabulary give way to a more difficult test of grammar comprehension and a standardized test of vocabulary comprehension (The Ammons Free Range Picture Vocabulary) at 21, 24, and 27 months. And, now the results become a little more ambiguous. Both A groups significantly surpass the working-class Cs at 24 and 27 months, but at 21 months the middle-class As significantly outperform the working-class As, (MA versus WA; 11.0 versus 4.2; t=2.6; $p < .05$) and the means of the working-class As and Cs are not significantly different. These occasional lapses would be no cause for alarm if the tests of Abstract Abilities did not also suggest that the working-class As and Cs are closer in intellectual competence than the design of the study permits.

Development of Abstract Abilities. As was the case for the language test, the results for the tests of Abstract Abilities at 12 and 15 months show a nice separation between the A and C groups. At 12 and 15 months the Uzgiris-Hunt tests of Object Permanence indicates that the two A groups have made similar progress and both are more advanced than the working-class Cs. However, at the three later test points, 21, 24, and 27 months, the Uzgiris-Hunt tests are replaced by three tests adapted from Meyers *et al*., (1964) which deal with the ability to match shapes and colors, to complete geometric patterns, and to complete pictures of familiar objects. These tests produce a mixed bag of results. On one of these tests, the Picture Completion Test, the two A groups perform similarly at all three test points and their means are significantly higher than that of the working-class Cs. But on the other two tests the mean for the working-class As falls between that of the middle-class As and the working-class Cs (sometimes it is even lower than the latter mean) and is usually not significantly different from either of these two means. Worse, their status relative to the working-class Cs seems to be deteriorating rather than improving with time. (See Table II-11)

Suitability of One-Year-Old Starters for Testing Hypotheses

In summary the test results indicate that, at this point, among the one-year-old starters the working-class A group is not consistently superior to the working-class Cs in intellectual competence. These results must necessarily change our expectations regarding differences in early environments and experiences of the working-class A and C one-year-old starters. If the two groups are not clearly different in competence, then preceding logically we cannot expect their experiences to differ along the lines that we have hypothesized.

Table II-10

One-Year-Old Starters: Comparison of As and Cs on Development of Language Ability

Means and Standard Deviations

		Middle-Class A Age at Testing (months)		Working-Class A Age at Testing (months)		Working-Class C Age at Testing (months)	
Test		12	15	12	15	12	15
Developmental[a]	N=	8	8	6	6	6	6
Mean		15.1	18.9	15.7	17.3	12.0	13.7
s.d.		3.4	3.5	1.7	1.8	1.6	2.7

Results of T-Tests

	MA vs WA[c] Age at Testing (months)		MA vs WC Age at Testing (months)		WA vs WC Age at Testing (months)	
Test	12	15	12	15	12	15
Developmental						
t[b]	0.4	1.0	2.1*	2.9**	3.5***	2.5**
df	8	o	8	11	10	9

[a] Developmental age score in months.

[b] *$p < .10$, **$p < .05$, ***$p < .01$. The p values are for two-tailed t-tests.

[c] **MA=middle class, WA=working class, WC=working class, according to Hollingshead and Redlich.**

Table II-10 (cont.)

One-Year-Old Starters: Comparison of As and Cs on Development of Language Ability

Means and Standard Deviations

		Middle-Class A			Working-Class A			Working-Class C		
		Age at Testing (months)			Age at Testing (months)			Age at Testing (months)		
Test		21	24	27	21	24	27	21	24	27
Ammons FRPV[a]	N=	8	8	8	6	6	5	6	5	6
Mean		11.0	13.8	14.6	4.2	11.7	12.2	1.3	3.6	4.5
s.d.		4.9	4.8	4.0	4.1	3.8	2.8	2.0	2.9	3.6
Grammar[b]	N=	8	8	8	6	6	5	6	5	6
Mean		10.4	13.1	15.1	4.5	9.8	12.2	2.5	4.0	5.7
s.d.		4.4	3.3	2.3	2.6	4.0	3.0	2.7	2.4	3.6

Results of T-Tests

	MA vs WA[d]			MA vs WC			WA vs WC		
	Age at Testing (months)			Age at Testing (months)			Age at Testing (months)		
Test	21	24	27	21	24	27	21	24	27
Ammons FRPV									
t[c]	2.6**	0.8	1.2	4.7***	4.4***	4.5***	1.4	3.6***	3.6***
df	12	11	10	7	9	12	7	8	8
Grammar									
t	2.9**	1.5	1.7	3.8***	5.3***	5.1***	1.2	2.7**	3.0**
df	10	12	10	10	10	10	10	7	9

[a] Number of items passed on Ammons FRPV

[b] Number of items passed on Grammar section

[c] *$p < .10$, **$p < .05$, ***$p < .01$. The p values are for two-tailed tests.

[d] MA=middle class, WA=working class, WC=working class, according to Hollingshead and Redlich

Table II-11

One-Year-Old Starters: Comparison of As and Cs on Development of Abstract Ability

Means and Standard Deviations

		Middle-Class A		Working-Class A		Working-Class C	
		Age at Testing (months)		Age at Testing (months)		Age at Testing (months)	
Test		12	15	12	15	12	15
Hunt-Uzgiris[a]	N=	8	8	6	6	6	6
Mean		66.5	72.8	67.0	72.3	52.3	63.3
s.d.		5.3	5.3	5.4	5.5	9.2	5.5

Results of T-Tests

	MA vs WA[b]		MA vs WC		WA vs WC	
	Age at Testing (months)		Age at Testing (months)		Age at Testing (months)	
Test	12	15	12	15	12	15
Hunt-Uzgiris						
t[c]	0.2	0.1	3.1**	3.0**	3.1**	2.6**
df	12	12	10	12	8	10

[a] Total score on Hunt-Uzgiris Series I and Series V.

[b] MA=middle class, WA=working class, WC=working class, according to Hollingshead and Redlich

[c] * = $p < .10$, ** = $p < .05$, *** = $p < .01$. The p values are for two-tailed tests.

Table II-11 (cont.)

One-Year-Old Starters: Comparison of As and Cs on Development of Abstract Ability

Means and Standard Deviations

		Middle-Class A			Working-Class A			Working-Class C		
		Age at Testing (months)			Age at Testing (months)			Age at Testing (months)		
Test		21	24	27	21	24	27	21	24	27
Picture Completion[a]	N=	8	8	8	6	6	5	6	6	6
Mean		7.5	9.0	10.0	8.3	9.8	11.0	3.7	5.3	7.8
s.d.		1.7	2.3	2.1	4.3	2.3	1.8	3.0	1.8	2.7
Total Score	N=	8	8	8	6	6	5	6	6	6
Mean		24.5	30.3	33.0	15.8	24.5	28.6	10.3	13.0	25.5
s.d.		6.6	6.7	4.7	10.2	8.4	7.1	4.9	5.3	10.3

Results of T-Tests

	MA vs WA[b]			MA vs WC			WA vs WC		
	Age at Testing (months)			Age at Testing (months)			Age at Testing (months)		
Test	21	24	27	21	24	27	21	24	27
Picture Completion									
t[c]	0.4	0.6	0.8	2.6**	3.1**	1.5	2.0*	3.5***	2.1*
df	8	12	11	10	11	11	9	10	8
Total Score									
t	1.7	1.3	1.1	4.3***	5.0***	1.5	1.1	2.6**	0.5
df	11	12	10	11	11	9	7	8	8

[a] Point score on subtest.

[b] MA=middle class, WA=working class, WC=working class, according to Hollingshead and Redlich

[c] * = $p < .10$, ** = $p < .05$, *** = $p < .01$. The p values are for two-tailed tests.

Table II-11 (cont.)

One-Year-Old Starters: Comparison of As and Cs on Development of Abstract Ability

Means and Standard Deviations

	Middle-Class A			Working-Class A			Working-Class C		
	Age at Testing (months)			Age at Testing (months)			Age at Testing (months)		
Test	21	24	27	21	24	27	21	24	27
Form-Color[a] N=	7	8	8	6	6	5	6	6	6
Mean	9.0	9.8	11.0	3.0	6.0	9.8	1.2	1.3	10.0
s.d.	5.9	3.8	3.0	5.1	6.1	8.8	2.6	2.0	5.1
Pattern Completion[a] N=	8	8	8	6	6	5	6	6	6
Mean	9.1	11.5	11.6	4.5	8.7	9.6	5.5	6.3	7.7
s.d.	2.6	2.9	2.2	3.3	1.8	1.7	3.3	3.0	3.1

Results of T-Tests

	MA vs WA[b]			MA vs WC			WA vs WC		
	Age at Testing (months)			Age at Testing (months)			Age at Testing (months)		
Test	21	24	27	21	24	27	21	24	27
Form-Color									
t[c]	1.8*	1.2	0.3	2.9**	5.1***	0.4	0.7	1.6	0.0
df	11	10	8	7	9	10	7	6	7
Pattern Completion									
t	2.6**	2.1*	1.7	2.1*	3.0***	2.5**	0.5	1.5	1.2
df	11	10	10	11	12	11	10	8	7

[a] Point score on subtest.

[b] MA=middle class, WA=working class, WC=working class, according to Hollingshead and Redlich

[c] * = p ∠.10, ** = p ∠.05, *** = p ∠.01. The p values are for two-tailed tests.

We are therefore left in the position of being able to test our hypotheses only with regard to the two-year-old starters. A definite test of these hypotheses with respect to the one-year-old starters must await their completing the test series and the final classification of all these Subjects at 36 months.

Notes to Chapter II

[1] The development of the visual screening procedures was achieved by Dr. Melvin Zolot, O.D., a practicing optometrist with several years of experience with infants and preschool children. The hearing test was developed by Janice Marmor with the aid of Kathy Tennican, an experienced audiologist.

[2] Six of the twenty one-year-old starters were tested at 27 months, and fourteen were tested at 30 months. The reason for changing the test schedule was a practical one. Difficulties in recruiting Subjects made it impossible for us to study the later recruits after they reached age 27 months, whereas the earlier recruits could be studied until age 36 months.

[3] The rationale for this test is based on the work of David McNeil. The development of this assessment technique was the work of Mary Meader Mokler, Janice Rosen Marmor, and Burton L. White.

Chapter III

OBSERVING THE CHILD'S ENVIRONMENT

The major goal of our research project was to find out how the environments and experiences of highly competent and less competent children differ in early childhood. The basic hypothesis of our "natural experiment" is that differences in competence apparent in children by age three may to some extent be explained by systematic differences in the environments which these children encounter before age three. The aim of this study was not to prove that differences in environments cause subsequent differences in competence (we could not make such a claim from a descriptive study) but to specify which aspects of the environment actually are dissimilar for highly competent and less competent children, and to learn how environment enters into the day-to-day experiences of the child.

Assessing the Child's Environment

Our first practical goal was to develop a reliable way of measuring those features of a young child's environment which seemed most likely to influence his development of intellectual and social competence. At first, we assumed that there must have been many scientific attempts to measure the development of the young child in his natural habitat, the home. After all, children lived with us long before Social Science was invented, and where did they live, if not with mothers and fathers and brothers and sisters and neighbors in and around a place called "home"?

This expectation was to be deeply disappointed. After months of searching the research literature we found little that was useful. The vast majority of studies we could find merely characterized the child's natural environment in terms of socio-economic status: how much income the family had, how much education the parents had, and where the family lived. This is true of even the classic studies on the nature-nurture issue cited by Jensen (1969), and others. Little attempt was made to ascertain the actual experiences in different types of homes which promoted or retarded the child's development. For example, we could find no studies investigating how money was used to help a child learn, or whether a highly educated mother taught her own child more efficiently than a less well educated mother. The typical research study simply classified a child as belonging to a given socio-economic class or cultural group and compared the intellectual, social or emotional development of the groups, as if merely belonging to the group rather than the child's actual experiences in it, determined how the child developed.

Definition of Environment

Given this bias in existing research, we decided that the first steps we should take in studying the influence of the environment on development was to replace the sociological definition of environment by a psychological one. Our aim was to define "environment" in terms of its role in the experiences undergone by the child and to categorize these experiences according to their importance for the child's intellectual or social development. This aim is not easily accomplished. The term "environment" is a broad one and may be used to cover the whole range of economic, physical, social, intellectual, and cultural forces which impinge upon the individual. These include remote institutional and historical forces as well as immediate sensory stimuli, and single traumatic events as well as routine, day-to-day happenings.

It is obviously impossible to measure all these things simultaneously, reliably, or sensibly. For our research we needed a narrower definition of environment which would focus our efforts on variables which could be observed and reliably measured and which were likely to be connected with the child's development. With this idea in mind we therefore defined environment as: "a set of human and non-human elements in the external world which are observably connected with the child's experience and which may affect his development of competence directly either through participating in a developmentally-pertinent experience, or by making such an experience more or less likely to occur or more or less pleasurable or likely to be repeated."

The main point to be noticed about this definition is that it defines assessment psychologically rather than sociologically, that is it defines environment in terms of its role in the child's experience. The child, at least when he is awake, is always experiencing some part of his external environment. If he looks it is at something, if he plays it is usually with some object, if he is being cared for it is by someone else. Thus, on any particular occasion some element in his environment can be said to be psychologically active or "functional" for him. The research method and scales which we use in this study focus predominantly on these active or "functional" elements of the child's environment. Specifically, in describing the child's environment, we first designate the relevance of the child's experience to his development of intellectual and social competence, and then we characterize the role played by elements of the external environment which enter into that experience.

As our definition states, the direct role played by environment in the child's experience may be participatory or non-participatory. By participatory we mean that the environment, let us say a person, has actually shared in the experience which we have judged to be relevant in some degree to the child's development of competence. By non-participatory we mean that the person has not actually participated in the experience itself, but has initiated it, facilitated it, reinforced it, restricted it, or influenced it in some observable way. For example, a mother may join with a child in playing with a toy. We may judge the child's experience, the game the child and mother play together, as highly likely, or moderately likely, or not at all likely to promote the child's intellectual development. Whatever may be our judgment, the mother is considered to have played a direct participatory role in promoting the child's development in accordance with our assessment of the intellectual or social value of the experience. Now, on another occasion, this mother may merely suggest that the child play with the toy. In this case, the mother's behavior is still directly connected with the child's experience (at least while she makes the suggestion), but she plays a non-participatory role in the child's subsequent play with the toy and consequently, a non-participatory role in an experience which may turn out to have much, little, or no developmental value for the child.

Here are two concrete examples to illustrate a mother's direct, participatory and non-participatory roles in a child's experience. Imagine we are observing a mother and child playing with a set of animal toys. The child grabs the animal shapes eagerly, while the mother tells him their names and makes appropriate roaring, mooing, and bleating sound bringing to life a miniature zoo. The child's experience in this illustration has to do with learning the names for the animals and the sounds they make, and this experience is judged as highly likely to promote his intellectual development. The mother's role and the role of the toy animals in the experience is a direct, participatory one. She and the animals are functional parts of the child's human and material environment; they share in the child's experience, and they promote his intellectual development directly.

The mother's non-participatory role can be exemplified by changing the illustration a little. Suppose we observe the mother suggesting to the child that he play with his toy animals in the manner described above. The child accepts her suggestion and plays with the animals by himself, naming them and imitating their sounds while his mother is busy in another room. The mother's role here is non-participatory so far as the experience which promotes his intellectual competence (actually playing with the toy animals) is concerned. By her suggestion she has made this experience more likely to happen (and perhaps also more enjoyable because of her encouragement) but, her behavior is not an integral part of the experience as in the previous example when she actually played with the child.

So far we have described two ways in which a mother or other person may _directly_ influence a child's experience and so his development of competence. Our research method focuses predominantly on those roles which involve interactions between mother and child, but we also study two other more _indirect_ roles which a mother plays. One of these is called the mother's _managerial_ role. This is the role she plays as organizer of the child's daily routine, designer of settings for his activities, and maker of rules governing his access to people, places, and things. This role overlaps with the mother's interactive roles discussed above in the sense that if the mother is actually observed taking part in the child's activity, suggesting something for the child to do, or invoking a rule, these actions would be considered part of her direct, participatory or non-participatory roles. Perhaps, the mother's managerial role is best thought of as the unobserved side of her direct roles. It refers to the whole framework of time, space, and rules with which the mother regulates the child's activity, including how much time she devotes to activities with him, how much television the child is allowed to watch, what places and objects in the home he is permitted to use, whether he has a play area and how it is equipped, and who are his playmates and adult acquaintances. The mother's managerial role is not fully observed in this study, but is constructed from "typical day" interviews in which mothers are asked to recall the child's activities of the previous day and from descriptions of the child's toys and the design and furnishing of the home.

The fourth role of the mother which is evaluated in this research is her diffuse role. This is her role when she is considered as a totality and not merely in relationship to her preschool child. This role consists of many factors such as the mother's personality, her socio-economic, cultural and educational background, her responsibilities for other members of the family, work obligations, her feelings toward young children, her awareness of their developing needs and her beliefs regarding how these should be met. Also included are "sociological" variables such as the number of people in the family, the distribution of authority and responsibility, work obligations of the mother, family income and education, and other factors which shape the "realities of life" for the child's family, and, in turn, affect his experience. Information relevant to the mother's diffuse role is not fully observed but gauged through interviews, general observations and incidental conversations.

Before going on to describe the actual instruments which we developed to study the child's Environment, a word should be said about the basis for judging experience in these scales as compared to the Task scale used in White's research (1972). Both the Task and Environment scales use dictated descriptions of the child's activity and the surrounding context as their raw data for coding experiences. However, from that point the perspective of the two scales differ. An observer using the Task scale focuses almost exclusively on the behavior of the child, interpreting the task the child is trying to do from moment to moment. For example, the child's task may be interpreted as exploration, mastery of skill, gaining information, achieving social contact, and so on. An observer using the Environment scales also focuses on the child's experience but her concern is with assessing its intellectual or social value for him. Since the quality of the child's experience may depend not only on the child's own behavior but also on the behavior of other people or the characteristics of objects which enter into that experience, information on these environmental factors is also analyzed in detail and used to judge the value of the child's experience for him.

Scales for Assessing the Direct Role Played by the Child's Environment in His Experience

We developed two scales for assessing the direct role played by the child's environment in his experiences. The first scale, the Human Interaction Scale, focuses on the active role played by people in the child's experience, and is applied only to those experiences of the child which involve interactions between the child and other people. The second scale, the Object Interaction Scale, focuses on the active role played bv the child's non-human environment in the child's experience. This scale is applied to all of the child's observed experiences since some aspect of the material environment nearly always participates in the child's experiences. In both of these interaction scales, the child's experience is labeled "interaction" in order to distinguish it from "experience" as treated in the Task scale, although the raw data describing the child's experiences is similar for all Task and Environment Scales.

The Human Interaction Scale[1]

To use this scale, the observer starts by making a running commentary of the behavior of the child and others with whom he is interacting, then later codes each unit of interaction on six dimensions. The dimensions are: (1) The Person with whom the child is interacting; (2) The Quality (content and value) of the interaction (this may be ongoing, being prepared for, or being suggested to the child);(3) the Style or Technique of interaction used by the other person; (4) Who initiated the activity; (5) Whether the other person encouraged or discouraged the activity; (6) Whether the other person was successful in attempting to control the child, if such an attempt was made. Quality and style of interaction are the two major dimensions of the Human Interaction Scale and we shall describe them in full. The other dimensions are self-explanatory.

First a note on terminology. In the manuals for the Human Interaction and Object Interaction Scales and in previous publications (White, Watts _et_ _al_., 1972; Watts, 1972), the term "Activity" is used as a label for the child's interactive experiences with people and things. This term is misleading if it suggests that the child always plays an active role in these interactions. In this report we will try to minimize ambiguity by using the following terms consistently. "Interaction" refers to the child's interactive experiences with people or things, or with people and things jointly; the term "activity" refers to the child's behavior when he is not interacting with people; the term "quality" refers to differences in either the value or content of the interaction; "value" refers to the judged intellectual or social value of the child's interactions and such terms as "intellectually valuable" "intellectually promising" and "highly intellectual" refer to interactions that are judged to be of high intellectual value to the child; "content" or "topic" refers to the ideas or things the child is likely to be learning about or the skill he might be developing; "style" or "technique" refers to the form another person's behavior takes when he interacts with the child; and "approach" or "attitude" refers to the encouraging, discouraging or neutral posture of an interactor towards the child.

Quality of Interaction: Content

A major interest in the Preschool Project has been what children learn from their environments in their everyday lives. Long before they go to school they have incorporated a really remarkable amount of information about the world as well as having established many basic language and conceptual skills. The Interaction categories in the Human Interaction Scale have been chosen in order to specify our best guess as to what a child might be learning from his interaction with his environment. In Table III-1 we have grouped these interactions into 15 types and given examples of the kinds of child behaviors that would normally suggest the learning of each content or topic.

Table III-1

Interaction Coding System

	Content	Intellectual Value	Examples of Child Behavior
1.	Verbal, symbolic learning	I (high)	Labeling pictures, learning names for things, counting, being read a story
2.	Spatial, perceptual, fine motor learning	I	Building a tower of boxes, putting different shaped blocks in a shape box, learning size relationships like "bigger" or "smaller" using crayons, putting together tinker toys
3.	Concrete reasoning	I	Learning "scientific" concepts like gravity and reflection, learning how things work
4.	Expressive skills	I	Imaginative games like "playing house," making a drawing of something
5.	Executive skills	I	Doing household chores such as picking up, playing sequence games like "Ring around the Rosy"
6.	Play with household items	II (moderate)	Handling or investigation of man-made, non-play things such as kitchen utensils
7.	Play with toys	II	Handling or investigation of children's toys
8.	Exploration of nature	II	Playing with pets and other naturally occurring things like sand, water, plants
9.	Gaining general and routine information	II	General conversation
10.	Basic Care	III (low)	Carrying out behavior having to do with physical needs, such as bathing, dressing, eating, using the toilet

Content	Intellectual Value	Examples of Child Behavior
11. Large Motor Skills	III	Learning to walk, run, climb stairs and using large motor toys like tricycles, slides, swings
12. Unspecific	III	Purposeless behavior of wandering or staring blankly
	Social Value	
13. Positive Emotional Expression and Social Behavior	Positive	Expressing affection or kindness, playful teasing or roughhousing
14. Negative Emotional Expression and Social Behavior	Negative	Crying, tantrumming, teasing or hurting
15. Neutral Emotional Expression and Social Behavior	Neutral	Using a "security blanket," seeking attention or reassurance

It may be helpful for the reader to think of the basis for our categories as similar to the learning-goals an evaluator of a Head Start program might have in mind when she observes different types of activities scheduled in the classroom; story-book time (Verbal Learning), puzzle time (Spatial, Perceptual and Fine Motor Learning), jungle-gym time (Gross Motor Learning.) If the child actually engages in the prescribed activity, then he may be assumed to be learning the skill which that activity is designed to teach. In our system, the observer is a bit like the Head Start evaluator. She does not prescribe activities for the child but has in mind a set of developmental goals by which she judges his behavior. Using a complex and somewhat arbitrary set of criteria to be described later, the observer codes the child's interactions according to the opportunity they present for the child to develop certain intellectual or social skills.

Of course, in making the analogy between school-evaluator and observer we should not gloss over the fundamental differences which exist between the school and home setting. In the home, no one normally plays the role of the teacher, playthings are not usually designed to promote specific intellectual or social skills, and the child's activities are not scheduled in advance, last only a short time, and change character rapidly. Indeed, the most difficult aspect of the observer's task is to demarcate units of interaction as they occur spontaneously, and to categorize these interactions according to criteria which, in practice, seldom are unquestionably met.

Here is an example drawn from a real observation to illustrate the rapid and spontaneous changes in content of interactions which typically confront an observer in the home.

Mark, (2 1/2 years) finds a tiny bead on the floor and runs to his mother holding it out and shouting, "Ma!" Mother looks at the bead and says, "Right. Put it in the box." (pointing to a sewing box on a shelf near her). Mark moves towards the box, but instead of putting in the bead, takes out a narrow plastic tube filled with tiny beads. He sits on the floor and begins to tip the tube up and down, watching the beads roll down and back. He pulls out the stopper with his teeth (a feat requiring some dexterity), carefully tipping the mouth of the tube up and down as if experimenting with gravity, and tips all the beads onto the floor. Mother notices and says sharply, "Now, look what you have done. Put them all back in." Mark begins to pick up the tiny beads one by one and slide them into the tube. Mother looks and says, "Do it like this." She gets down on the floor, wetting the tip of her finger. Mark wets his finger in imitation. Mother begins to count the beads as they put them in alternately. Mark repeats the numbers she calls out: "One, two, three..." Mark says, "red." Mother: "It's not red, it's purple. See it in the light." She holds up the bead to the window and Mark looks intently and smiles, saying, "Not red, purple!"

In terms of our scale there are four changes in interaction content in this episode. At first the interaction is concerned with the Mother unsuccessfully trying to get the child to carry out an instruction requiring Executive Skill involving a sequence of steps (put the bead in the sewing box). The next interaction focuses on Concrete Reasoning (Mark initiates an experiment with gravity) of which mother disapproves and she orders him to carry out another task (put the beads back into the small tube) which very likely involves the learning of Spatial, Perceptual and Fine Motor Skills. She observes Mark's attempts at mastering the fine motor task and then demonstrates how to do it. The content then shifts to Verbal Symbolic Learning (counting and labeling) which the mother initiates and teaches.

In this example not only is the child's behavior rapidly changing, but the mother's actions in relation to each of these activities also change: she does not necessarily interpret the content of the child's interaction in the same way as the observer. When the mother said, "Now look what you've done; put them all back in," she probably had no conscious intention of cutting off Mark's attempt at Concrete Reasoning, nor of launching him off on a Fine Motor sequence. However, this seemed to be the effect on the child and these are the interaction contents that are coded.

Quality of Interaction: Value

The fifteen categories of interactions listed in Table III-1 may also be clustered in terms of their judged value to the child's intellectual or social development. The first cluster of categories (Cluster I, categories 1-5) are situations which seem to us highly likely to promote learning of intellectually valuable material. In making the judgment that a situation presents an opportunity for learning we have not limited ourselves at all to the use of "educational materials" or formal "lessons," but instead have defined the categories so that they apply to a whole variety of experiences that young children may have. For example, a child learning the names of the pictures on his pajamas is, from our point of view, having as much of a language learning opportunity as the child who is learning names of pictures in a book. Or, as another example, sorting silverware into piles of forks and knives and spoons can be seen as being just as "educational" as separating round blocks from square blocks from triangular blocks. What is important in all of these first five Content categories is a kind of structure and apparent purposefulness which is put into the situation by the child or by another person interacting with the child.

The second cluster of categories (Cluster II, categories 6-9), are situations of generalized experience which appear to be only moderately likely to promote learning. Again, this is a judgment and constitutes a guess on the part of the observer-coder who cannot really know what the child may be learning. In common language terms, these are often situations in which the child is "playing," either with toys, household items or natural substances. The materials used may or may not be ones designed for a specific "educational" purpose. For example, banging tinker toys together or pushing a toy car along the floor would both be called Play with Toys.

Included in the third cluster of categories (Cluster III, numbers 10-12) are experiences which are crucial to the child's physical development and well-being, but which are considered to be not likely to promote intellectual learning. The Content categories in the third group are primarily Basic Care experiences like being bathed, dressed and fed, and Large Motor Learning experiences of learning and practicing skills like running, climbing, riding tricycles and so forth.

The final group of three Content categories are those which are related to social learning and emotional behavior. The first labeled "positive social interactions" includes purely "social" interactions such as roughhousing, kicking and giggling together as well as other positive experiences such as expressing affection or learning consideration for others; the second labeled "negative social interactions" includes situations of crying, tantrumming and aggressiveness; the third, labeled "neutral social interactions" includes experiences of seeking emotional security and social contact.

Criteria for Judging the Intellectual Value of an Interaction

Several criteria are considered in deciding whether an interaction is likely to stimulate intellectual development in the child. The first set of criteria have to do with the child's own behavior in the interaction. (In the Human Interaction Scale only interactions between the child and other persons are coded). If the quality of the child's own behavior indicates that the experience is highly likely to promote his intellectual development, the interaction is automatically coded on that basis. However, if the child's own behavior is passive or primitive, the behavior of other people in the interaction becomes crucial to the judgment of its value. For example, a clear-cut case for judging an interaction as "highly intellectual" occurs when the interactor teaches the child conceptual or symbolic material. In this case, the child's role in the interaction may be limited to looking and listening but the opportunity for his intellectual development is clearly present.

Table III-2 illustrates how two common situations for a young child, "S uses a book" and "S is being changed" can give rise to quite different value and content codes as the level and purpose[2] of the child's behavior change and the behavior of the interactor also changes. Some of the resulting interactions are considered as highly likely (examples 1-5 and 8-12), others as only moderately-likely (examples 6 and 13), and others as not likely (examples 7 and 14) to promote the child's intellectual development. One interaction (example 15) is judged primarily relevant to the child's social and emotional development.

The examples of Table III-2 should also make it clear that intellectually valuable interactions by no means typically involve "lessons" or educational materials. On the contrary, almost any situation may become a "highly intellectual" interaction that is, an opportunity that is very likely to promote the child's intellectual development, so long as the child's behavior is reasonably systematic, structured, purposeful, attentive, etc. There really is no one word to describe the essential distinction between the wide array of interactions which the observer will judge to be of high intellectual promise and those she will judge to be of less intellectual value. Again, we have to fall back on the examples of Table III-2 . When the child in Series I, listens to mother read "Goodnight Moon," or tries to find the tiny mouse in the picture, or watches the shadow of her mother's finger on the book, or tidies up, putting the books and toys away, all of these interactions are judged to be of high intellectual value, although the specific intellectual gain for the child varies from one example to another. In contrast, when the child in Example 6, simply transfers a book from one place to the other we judged this experience as only moderately likely (at best) to promote his intellectual development and think of it as unstructured, unsystematic "Play

Table III-2

Quality of Interaction

Cluster I = Highly Intellectual Interactions, Cluster II = Moderately Intellectual Interactions, Cluster III = Non intellectual Interactions Cluster IV = Social-Emotional Interactions

Series I. S uses a book

Example	Cluster	Content of Interaction
1. M reads "Goodnight Moon" to S and they label pictures	I	Verbal/Symbolic learning
2. M asks, "Can you find the little mouse?" S looks for the tiny mouse imbedded in the detail of the picture.	I	Spatial/Perceptual Fine Motor Learning
3. S watches the shadows of her finger on the book. M moves S's finger and S watches the shadow move.	I	Concrete Reasoning
4. S pretends to be the bunny in "Goodnight Moon." S curls up on the couch saying, "Goodnight chair, goodnight comb, goodnight brush." M smiles	I	Expressive Skills
5. M asks S to put toys away. S takes the books and toys; a few at a time, to the toy box, closing the lid when they are all in.	I	Executive Skills
6. M says, "Go find something to play with." S takes a book down from a bookshelf and puts it on the table. S touches the covers but says nothing.	II	Plays with toys
7. S wanders about clutching a book, staring blankly into space.	III	Purposelessness

Series II. S is being changed on changing table

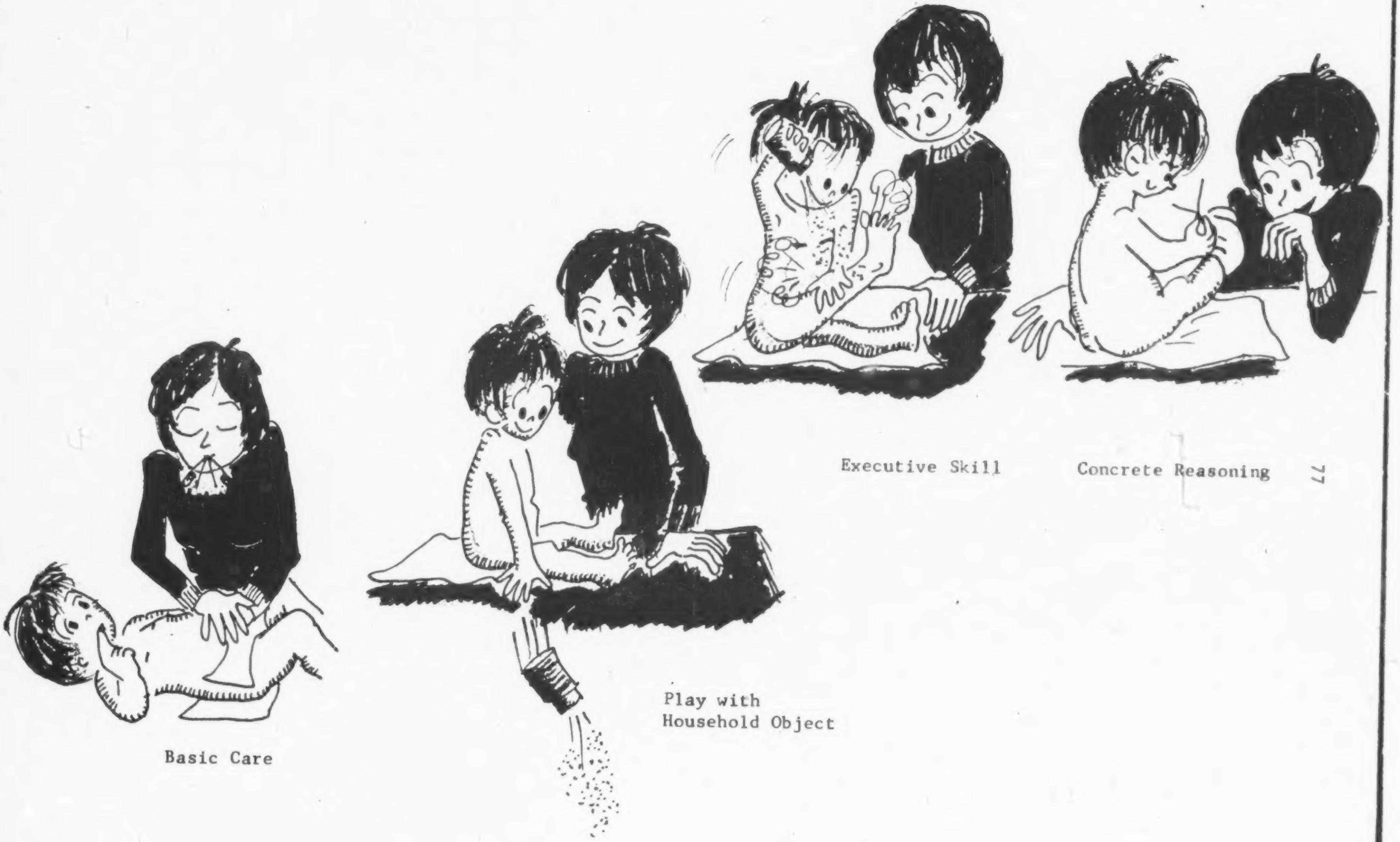
Example	Cluster	Content of Interaction
8. M bends over to change her. S touches M's hair, and babbles. M says, "hair, that's hair."	I	Verbal/Symbolic learning
9. S gets hold of a shoe lace and seems to be trying to lace her shoe. M looks on saying, "It's hard, isn't it?"	I	Spatial/Perceptual Fine Motor learning
10. M plays peek-a-boo hiding her face behind a diaper and saying, "Where's Mommy?" S chuckles.	I	Concrete Reasoning
11. S makes a pouring motion on doll's head. S says to M: "Baby's crying." (S often cries when her hair is shampooed).	I	Expressive Skills

Example	Cluster	Content of Interaction
12. M suggests S powder herself. S shakes container of powder over her legs, then rubs it in. M looks on.	I	Executive Skills
13. S takes container of powder and shakes it briefly, then throws it on the floor.	II	Explore or Play with Household Objects
14. M changes S on changing table. S lies prone staring at ceiling.	III	Basic Care
15. M finishes diapering S. She bounces S and kisses her. S laughs and hugs M.	IV	Positive Social-Emotional

with Toys." A more extreme instance of relatively "empty" behavior is in example 7, where the child is wandering around with a book in hand, staring into space and essentially "doing nothing." This behavior is coded as "Purposelessness" and considered to be not relevant to intellectual development.

More striking than the examples of Series I, Table III-2 are the examples of Series II (also illustrated in Figure III-1)which presents a situation that is ordinarily far from educational in nature. The occasion is one with which most observers of young children are familiar: The child lies supine on a changing-table while mother changes his diaper. Commonly, the child accepts the situation passively and whiles away the time staring or babbling at nothing in particular. This situation is coded as "Basic care" and represents minimal intellectual stimulation. However, an enterprising mother sometimes uses this time to entertain the captive child with a peek-a-boo game, or an energetic child might get hold of his shoes and try to tie the laces, entertaining the mother with his antics. These departures from the mundane task of diapering provide the child with opportunities for intellectual development, so we code the peek-a-boo game as relevant to "Concrete reasoning" (the child is learning the concept that a thing continues to exist although it is hidden

Figure III-1



Basic Care

Play with
Household Object

Executive Skill

Concrete Reasoning

DISTINCTION AMONG HIGHLY, MODERATELY AND NON INTELLECTUAL ACTIVITIES from sight) and the shoe-lacing episode as helping the child to develop "Spatial, perceptual, and fine motor skills."

It should be clear from the examples above that the child's own behavior, his level of functioning, and the task he is trying to accomplish all have a major influence on the choice of code for quality of interaction in our Human Interaction Scale, although these items are not explicitly coded in this scale. However, as its name implies, a major ingredient of the interaction scale is its interactive quality, hence the behavior of other people interacting with the child may also determine the judgment of content and value of the interaction, and the form of their behavior is explicitly coded. Let us examine now how the interactor's behavior is analyzed and coded.

Style of Interaction: Techniques

The technique dimension of our Human Interaction Scale provides us with basic information on the direct roles the mother and other people play in the child's experience, providing a means of coding the form taken by their behavior when they interact with the child. The technique or style of interaction may be classified in accordance with our analysis of roles discussed earlier in this chapter. The distinctions made in that analysis are vividly conveyed by the cartoons of Figures III-2-III-7 which show an interactor sometimes playing a participatory role in the child's activity (for example when the mother reads the magazine to the little girl in Figure III-2); sometimes playing a non-participatory, but facilitative role (for instance, when she provides the pots and pans to the little boy in Figure III-3); sometimes playing a non-participatory, but restrictive role (for example, when she scolds her daughter for reading the magazine in Figure III-2); and sometimes playing a neutral role (for

VERBAL/SYMBOLIC

Figure III-2

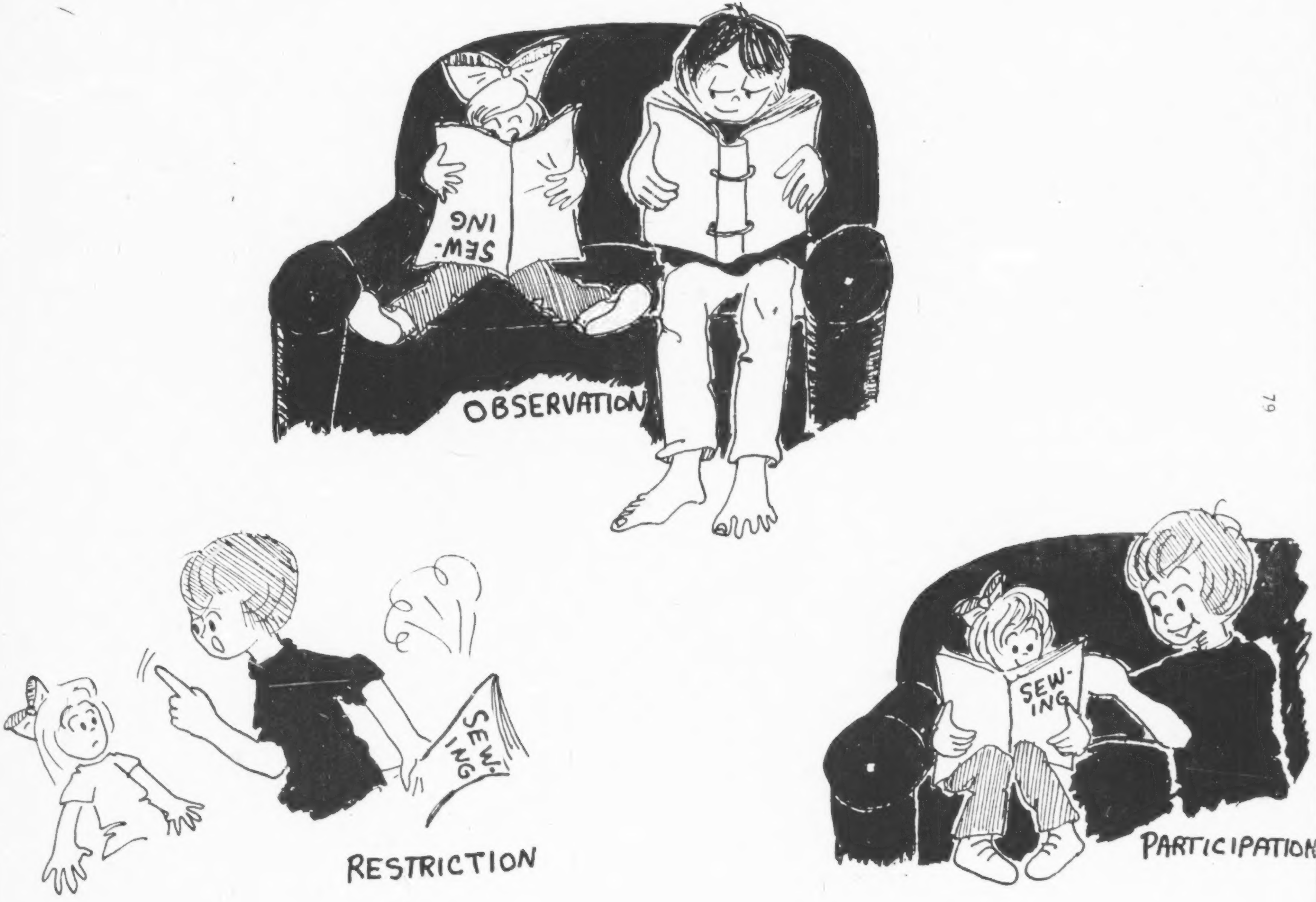

SEW-ING
OBSERVATION
SEW-ING
RESTRICTION
SEW-ING
PARTICIPATION

Figure III-3

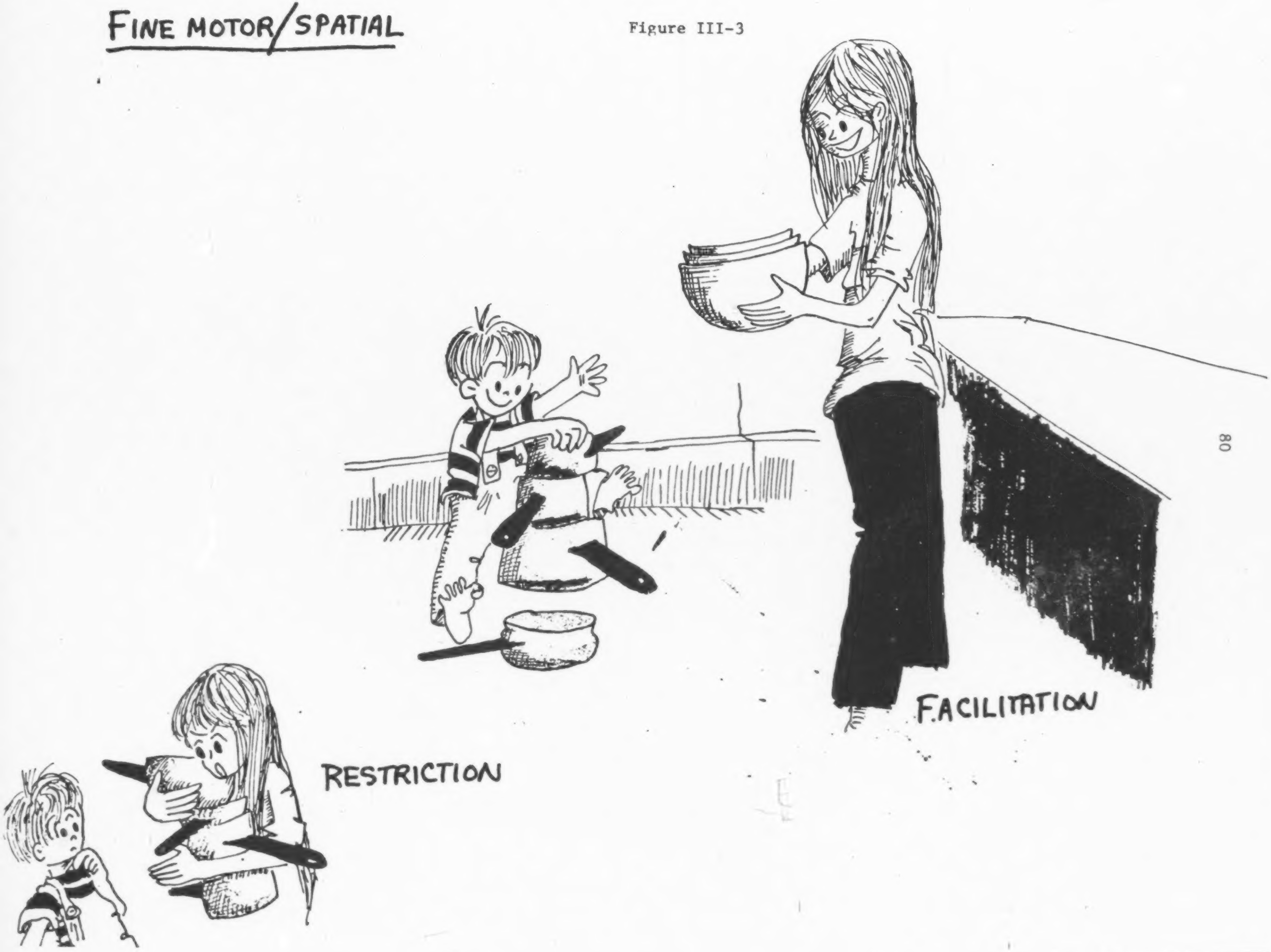

FINE MOTOR/SPATIAL
FACILITATION
RESTRICTION

Figure III-4

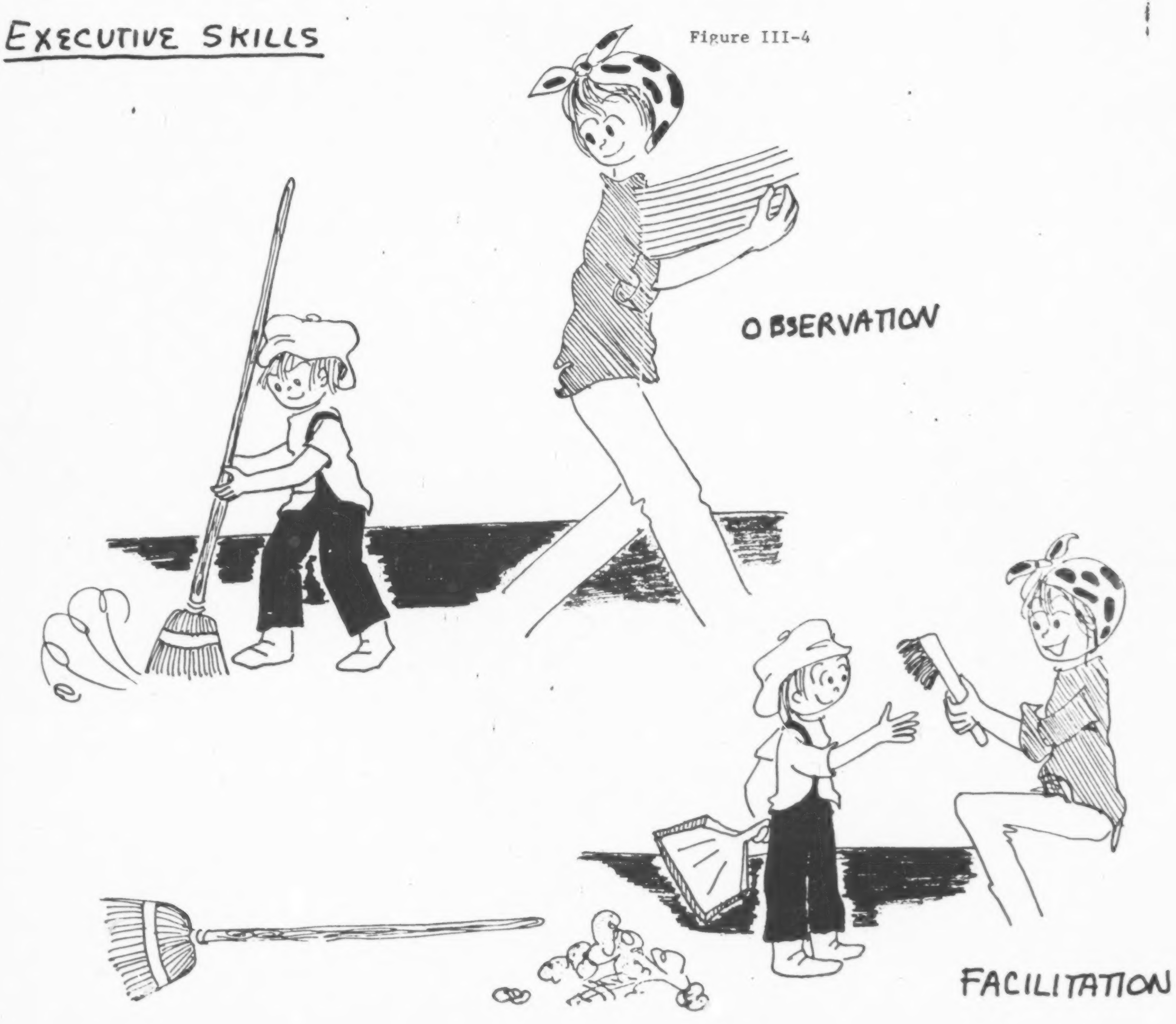
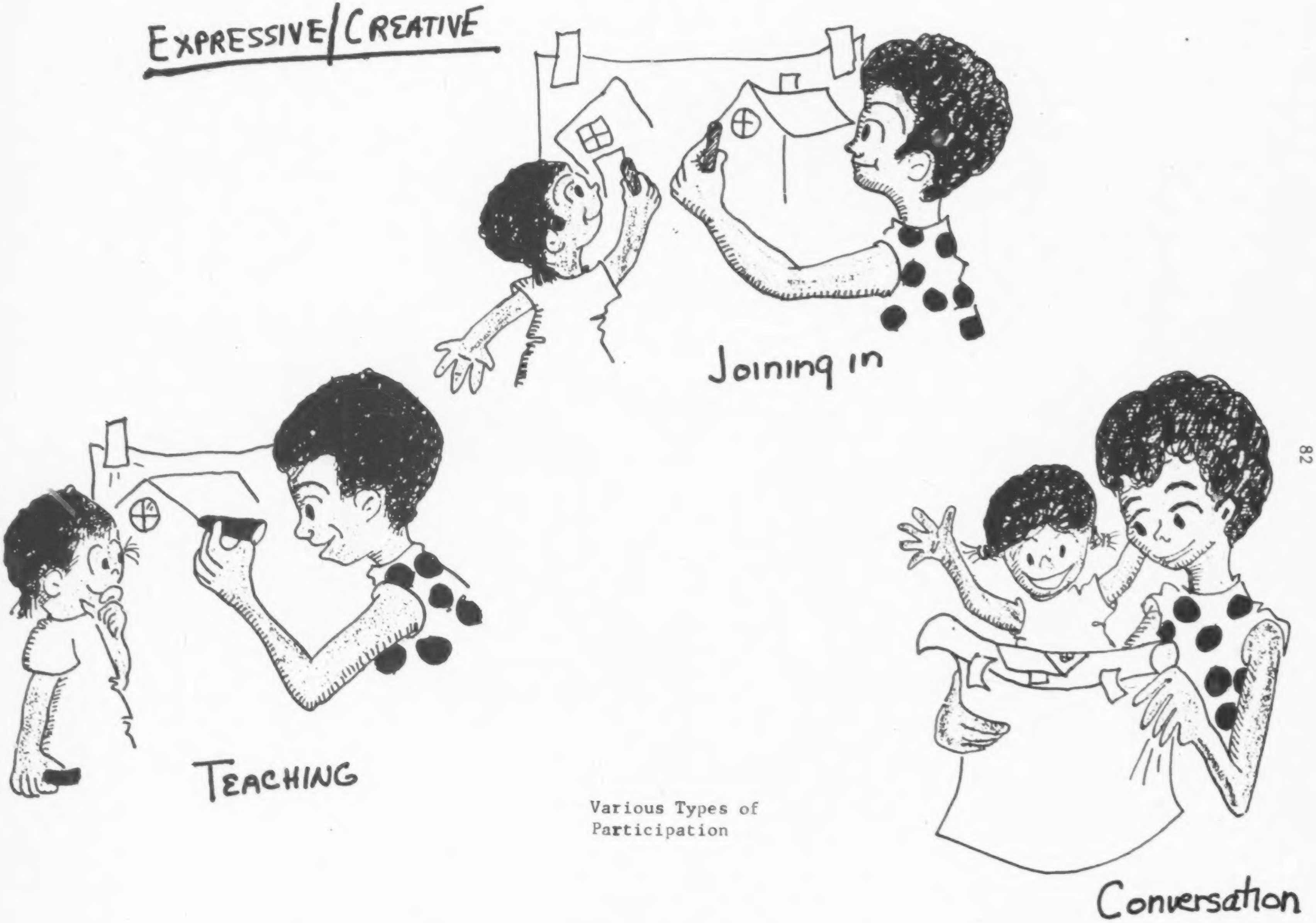
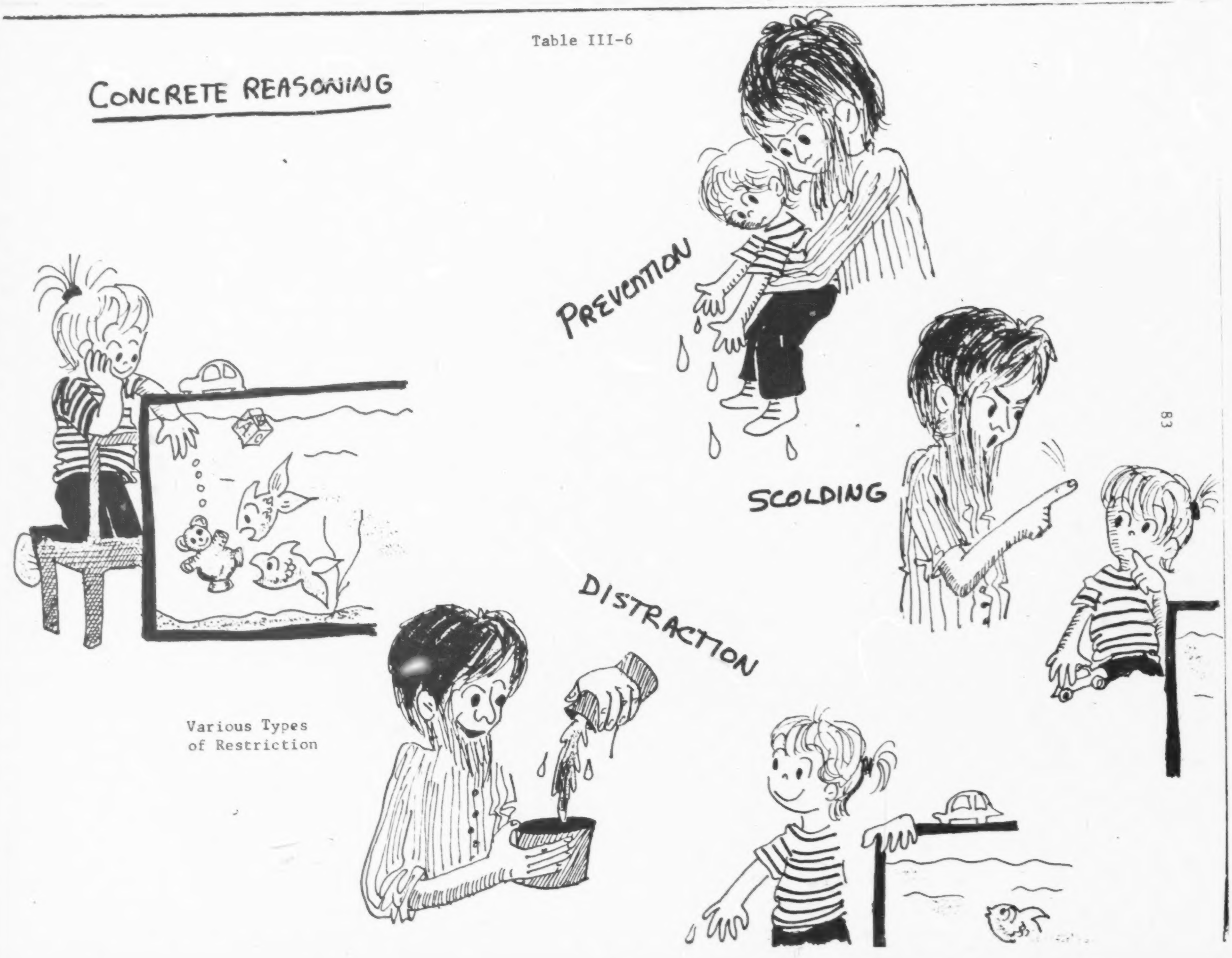

EXECUTIVE SKILLS
OBSERVATION
FACILITATION

Figure III-5


EXPRESSIVE/CREATIVE
Joining in
TEACHING
Conversation

Various Types of
Participation

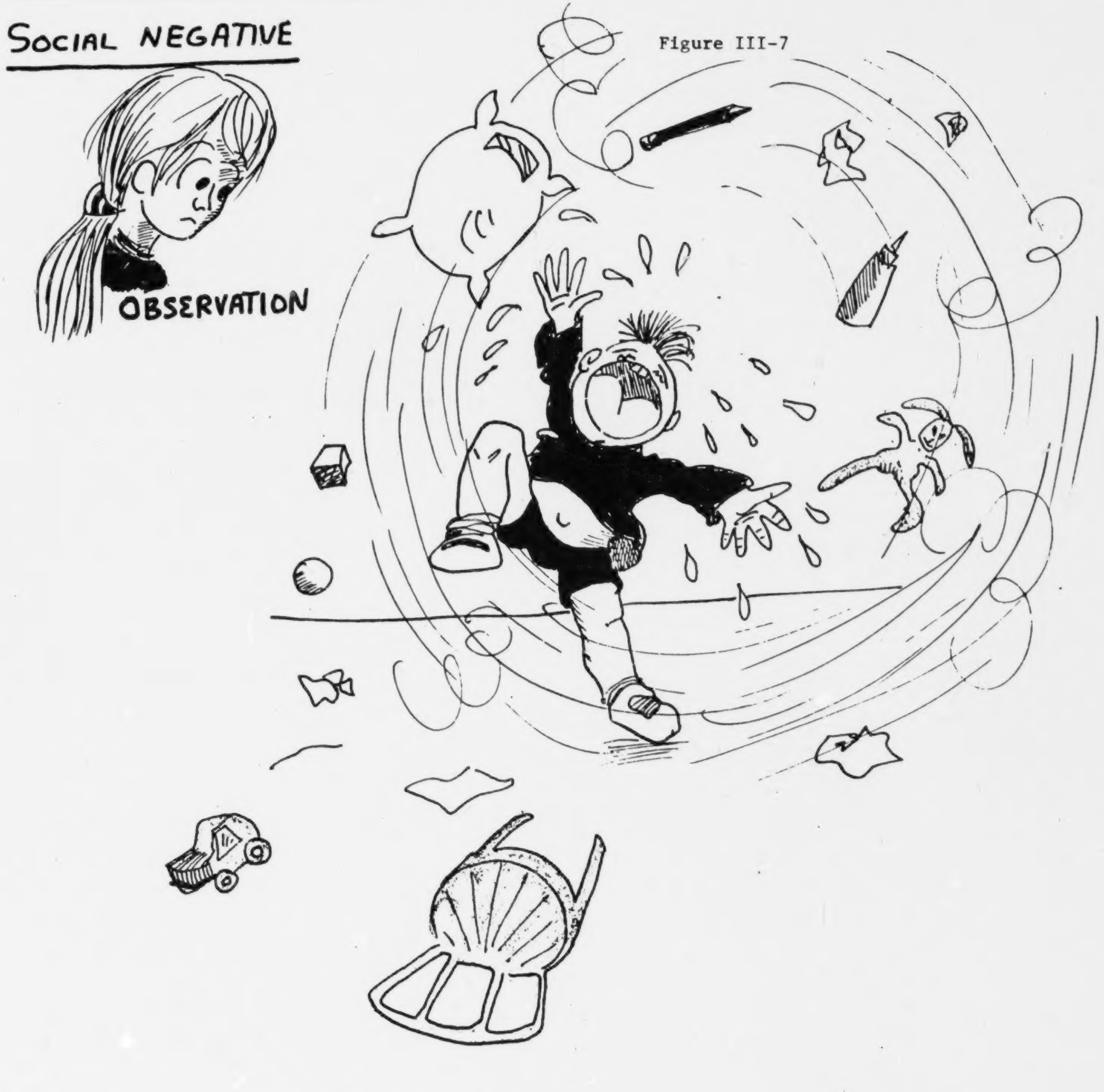
Table III-6


CONCRETE REASONING
PREVENTION
SCOLDING
DISTRACTION

Various Types
of Restriction

2

Figure III-7


SOCIAL NEGATIVE
OBSERVATION

instance, when she observes her son's sweeping up in Figure III-4 or having a tantrum in Figure III-7.

Of course, a variety of specific techniques may be used to play any of these roles and our coding different techniques within a role-category and considering them equivalent for purposes of analysis is somewhat arbitrary. Thus, within our system of analysis, an interactor plays a participatory role when he teaches the child, states reasons or justifications, engages in conversation with him, entertains him or joins in an activity with him. The common feature of these participatory techniques is that the interactor shares in the child's experience and is an integral part of it for him. The interactor plays a non-participatory facilitative role when he suggests an activity, supplies materials for it, praises or helps the child. The common feature of these non-participatory, facilitative techniques is that the interactor does not directly enter into the child's experience but makes it more likely to occur, or more pleasurable and likely to be repeated. The interactor plays a non-participatory, restrictive role when he prohibits or prevents the child from engaging in the activity, refuses to help, scolds him, or distracts him to another activity. The common feature of these non-participatory, restrictive techniques is that the interactor makes the experience less likely to occur or less pleasurable and likely to be repeated. Finally, the interactor plays a neutral, self-informing role when he merely observes the child engaging in an activity or listens to him when he talks.

Variations in the specific techniques used by an interactor to play a given role are illustrated in the cartoons of Figures III-5 and III-6. In Figure III-5 a mother uses three different techniques to play a participatory role in the child's experience: she teaches her little girl how to draw, joins in the actual production of a drawing, and finally chats enthusiastically about their artistic creation. Similarly, the father in Figure III-6 plays a non-participatory, restrictive role using three different techniques: he prevents the little boy from playing in the fish tank, he scolds him for dropping in the Teddy Bear, and finally, he tries to distract him to a more acceptable activity.

Interaction: The Remaining Dimensions

Quality (content and value) and Technique (the role played by the other person) are for us the two most important dimensions of the child's interaction with his environment. But there are four other aspects of an interaction which are coded, along with Quality and Technique, namely:

--Who is interacting with the child?

--Is the other person's attitude toward the child's behavior encouraging, discouraging or neutral?

--Who initiated the Content of the interaction? The child or the other person?

--If the other person is trying to influence the child's behavior, is he or she successful?

One of the real advantages of the Human Interaction Scale is that it is able to code these 6 dimensions simultaneously and thus analyze the effects of various combinations among them. To illustrate the connections between these six dimensions: Quality, Technique, Person, Initiation, Encouragement, and Success in Control, we give below some excerpts from actual observations to show how interactions are coded with respect to these six dimensions simultaneously.

1. Mark age 1 is playing in the bedroom off the kitchen. Mother is working at the sink. He picks up a toy iron from the floor. He

swings the iron back and forth, touches it, then chews on the handle. Mother looks in and asks, "What are you playing with? The iron?" Mark babbles to Mother and laughs. He drops the iron on the floor, then puts it in the nearby toy chest. Mother attends to dishes again.

In the first episode which lasts about one minute, the content of the interaction is Play with Toys, the other person, Mark's mother, responds to the experience which he has initiated himself by a Technique of general conversation, her attitude toward his play is neutral and she has not tried to influence his behavior.

2. John 1 1/2 years old walks into the kitchen where Mother is folding laundry. He picks up a drawing left there by his older sister. Mother tells him, "Barbara made that at school." He studies the picture and says "Ba-ba." Mother says, "See the sun. Can you say sun?" and points to the picture. He looks closely and repeats "sun, sun." Mother shows him a flower in the drawing and he says "flower." John puts down the drawing and goes into the living room where cartoons are on TV.

In this half-minute excerpt there are two different interactions which occur one after the other. In the first, his mother merely tells John who has made the drawing. The Content of interaction is Play with Household Items, Mother's Technique is general conversation, John has initiated the Content, mother's attitude is neutral and she has not tried to influence his behavior. Overall, then, the coding summary is very similar to the first episode above of Mark's mother chatting with him about his exploration of a toy iron. Both are general experiences which are considered moderately likely to promote learning. In the second half of the episode involving John, his mother, and Barbara's drawing there is a shift in several of the elements and a second interaction is coded. Mother's Technique changes from conversation to direct teaching, she is encouraging him to look at the pictures and say the words after her, she is successful in her attempts and finally, the Content of Interaction has changed from Play with Household Items to an opportunity for Verbal/Symbolic Learning even though the object involved, Barbara's drawing, has remained the same throughout.

The first two excerpts involving Mark and John are concerned with learning about things and ideas. In this final excerpt the focus is on social behavior.

3. Michael and his older brother have been quarreling over toys. Mother comes in just as Michael is about to bite his brother. Mother pulls him away and tells him, "No." She tells him, "Here, look at all the trucks for you to play with" and points to toys on the floor. Michael whines and pulls away from Mother. The brother laughs and teases him by holding out a toy car. He reaches for the car and cries, then runs to his brother and tries to bite him. Mother picks Michael up saying, "No, no, no!" Mother carries Michael to the window and says, "See the big truck outside with the ladder." He stands at the window watching the truck. Mother goes over to his brother and talks to him quietly.

The Content of Interaction is primarily that of Michael's negative social behavior. Even though another person is involved, the older brother, their mother's part is more nearly continuous and it is the behavior that is coded. Mother is responding to behavior which Michael has initiated and she is trying to discourage it in several ways. The Techniques she uses are scolding, distracting, and moving him away from the brother. After several attempts she is successful in stopping

Michael's angry outburst, which, incidentally, seems quite reasonable given the older brother's teasing.

We end this discussion of the Human Interaction Scale by reminding the reader that some degree of arbitrariness and imprecision enters into any scale of this sort which attempts to capture the meaning of free-flowing events in the lives of barely articulate, rapidly growing, highly mobile young children. We certainly do not know whether the structured use of materials (a large element in the distinction between "highly intellectual" and "moderately intellectual" activities) really does promote intellectual development more than the unstructured use of the same materials, or whether building block towers develops spatial skills more than it develops verbal skills. These assumptions are plausible but not necessarily correct. Their usefulness is seen in the ability of this coding system to organize our observation data and to relate it to development in the child and to activities that will later go on in school in a meaningful way. But we must stress -- as humbly as we can -- that this system is only a beginning which we offer in the hope of stimulating others to build still more useful, economical, and conceptually powerful ones to help unveil that fascinating mystery -- the growth of the child's mind.

The Object Interaction Scale

The Object Interaction Scale is used to code the child's use of objects and of his physical environment. It was amazing that in our search of the literature we could find no scale which measured by direct and repeated observation the availability, much less the use, the child actually makes of objects in his home environment. We could find no study which observed systematically such things as the toys, household objects, furniture, and space to which the child has access; the communication media to which he is exposed; the noise level, crowdedness, order, or consistency or routine which surround him. All the information we could find on the effects of the physical environment of the home was obtained from studies using interviews, retrospective reports, or, at most, one-shot observation (e.g., Bing, 1963; Hess and Shipman, 1965; Wachs *et al.*, 1967; Wolf, 1964).

We therefore decided to develop a simple scale of our own to assess the child's interaction with material aspects of his surroundings.[3] With this Object Interaction Scale, after each fifteen seconds of observation, we describe and later code:

1) The room occupied by the child.
2) Barriers and restrictions imposed upon him.
3) His activity (coded as in the Human Interaction Scale).
4) The person to whom he is attending.
5) The size and portability of objects to which he is attending or using.

Questionnaires for Evaluating Other Aspects of the Child's Environment

We have described at length the two scales which are used in our study to measure those aspects of the environment which enter actively into the child's experience. In addition to these two scales, three questionnaires were developed to provide more general information on the child's external environment. The first, the Typical Day Questionnaire is used to obtain information on the basic routine of the child's day and the child's range of experience, especially the amount of time regularly devoted to activities such as eating, sleeping, playing indoors, playing outdoors, and looking at television; the amount of time the child spent with certain people such as his mother, father, siblings, other adults, and other children; and the amount of contact the child had with people and places in and out of his neighborhood.

The Typical Day Questionnaire provides basic information on the mother's managerial role; the role she plays as organizer of the child's routine, designer of settings for his activities, and maker of rules governing his access to people, places and things. This questionnaire is administered each time we visit the child's home to make an observation for our Interaction Scales. Mothers are asked to recall as far as possible the child's activities during the 24 hours preceding the visit. Some mothers are able to do this with great facility, recalling changes in the child's activities say, every fifteen minutes. Other mothers remember only landmarks, such as breakfast, lunch and dinner, and describe most activities in between as "playing around." Differences in the specificity with which mothers are able to remember the child's activities are likely to be related to the mother's general awareness of her child's development, and the degree to which she plans and structures his experience.

The other two questionnaires are loosely structured schedules for interviewing the mother. These questionnaires provide information on the mother's diffuse role which we have previously discussed. Each mother in our study is interviewed before the first observation on her child and again when all observations are completed and the child is three years old.

The first interview includes questions relating to the family's socioeconomic status, educational, cultural and religious background, family routines, and so on. The second interview focuses on the mother's awareness of the child's development and of her own beliefs and behavior relating to him. This interview includes questions on the following points:

1) Division of responsibility for caring for and bringing up the child.
2) Inventory of toys and playthings.
3) Training in self care. Times at which the child learned to feed himself, keep clean, etc., and problems associated with training.
4) Mother's awareness of the value to the child's development of play with different toys, household objects, books and TV programs.
5) Mother's descriptions of the child's present personality and intellectual abilities and estimates of how he will have developed by the time he is 5-6 years old.
6) Mother's beliefs that aspects of the personality or intellect can be modified by her actions.
7) Mother's awareness of the effects of her own behavior on her child's development.
8) Mother's own activities, interests, and outlook on life.

The main aim of the final interview is to give the mother an opportunity to talk about her child, her relationship with him, and how he is developing; and to give us a chance to compare data from our own observations to the mother's reports.

Summary

We developed four instruments for measuring the effects of the child's human and material environment on his intellectual and social development. The first scale, the Human Interaction Scale is applied to interactions between the child and other people. It codes the child's experience and specific aspects of the human environment which are connected with his experience. The second scale, the Object Interaction Scale, codes the child's experience and various aspects of the non-human environment which enter directly into that experience. A third instrument, The Typical Day Questionnaire provides information on the child's daily routine and range of experience, while a preliminary interview and final interview with mothers gives more general information on the mother's personality, background, responsibilities and values.

Notes to Chapter III

[1] All scales and questionnaires described in this chapter were developed by Jean Carew Watts, Itty Chan Barnett, Nancy Apfel, and Christine Halfar with the assistance of Geri Kearse, a former staff member. These instruments are described in detail in the Appendix.

[2] "Purpose" in this scale corresponds roughly to "task" in the task scale described in a previous section, but is only one of several criteria taken into account in judging quality of interaction.

[3] After the data reported in this report was collected, the Object Interaction Scale was extended to incorporate all of the dimensions of the Human Interaction Scale and some new dimensions dealing with the design characteristics of objects used by the child, the child's mode, level and purpose in attending to a person or object, and the absence or presence of verbal stimulation. The new dimensions just mentioned have all along influenced our coding of "Activities" but were not explicitly coded in either the Human Interaction or Object Interaction Scale described in this report. This new scale, the Human or Material Environment or HOME Scale codes these dimensions explicitly, thereby taking account of all aspects of the Environment which are active in a single unit of experience. Data collected with this scale will be reported in a later publication.

Chapter IV

COMPARING ENVIRONMENTS

In this chapter we shall report and discuss our findings concerning the role of the human environment in the child's development of intellectual competence. We shall focus on the results from only one of our scales, the Human Interaction Scale, since data gathered with our other instruments have not yet been completely analyzed.[1] This means that we shall be discussing only those activities that occur when another person is interacting with the child rather than when the child is playing by himself. These interactions will be judged as having high, moderate, or little developmental value for the child, and we shall examine what particular form of behavior the other person in the interaction uses, and whether they are encouraged or discouraged by him.

Limiting ourselves to an analysis of data from the Human Interaction Scale also means that we shall be focusing mostly on the other person's direct roles vis-a-vis the child. We cannot now provide a quantitative analysis of the indirect roles played by other people in the child's experiences, but in the next chapter the influence of these roles will be discussed as we construct case studies of some individual children.

A third most serious limitation of our present report concerns the incomplete nature of the sample. At the present time many of the working-class Subjects who started in the study when they were one-year-old are still too young to have completed the test series, hence cannot definitely be classified as A or C. Moreover, the results of their most recent tests showed that 4 out of 6 working-class Subjects who we predicted would be As seem to be testing as Bs, and the results of one of the three tests of intellectual development --

the test of Abstract Abilities -- suggested there was no difference in competence between the putative working-class As and Cs. These results suggest that when future test data are collected at 30 and 36 months, the classification of some of these children is likely to change, hence the composition of the working-class A and C groups among the one-year-old starters will also change, and the data will have to be reanalyzed. Therefore in the following report we shall give only brief attention to the data pertaining to the one-year-old starters. It seems premature and futile to do otherwise.

Design of the Study

The study was conceived of as a "natural experiment" in which the experiences and environments of two "naturally occurring" groups of Subjects would be located and compared. One group was to consist of children who by the age of three had developed high levels of intellectual and social competence (to be called "A" children) the other was to consist of children who had developed relatively low levels of intellectual and social competence ("C" children). Half of the children in the study would start being observed and tested from the time they were one-year-old until they were three, while the other half would be observed from age two to three. The groups would be nicely balanced on sex and socio-economic variables so that in comparing the experiences of A and C children we could conclude that any differences found could be related to the competence variable rather than some other confounding characteristic. To turn the argument around, systematic differences in the previous environments and experiences of the A and C groups would suggest (though by no means prove) that these differences were to some extent responsible for the subsequent difference in competence in the children.

The ideal design for recruiting children to our natural experiment was sketched in Table I-3 . Notice this design merely called for locating children who we could predict would develop as As or Cs. Even so this ideal was hard to attain in practice and we eventually had to make do with a distribution of Subjects whose chief flaw was the virtual absence of middle-class Subjects who we could predict would develop as Cs. This design -- the Subjects whom we recruited, observed, and tested from age one to three or from age two to three -- was presented in Table I-4, Chapter I. (See I-3a, I-4a)

But our difficulties with constituting our sample do not end here. The real design of our study calls for a contrast between Subjects who actually demonstrated high or low levels of competence on various tests administered over the study period. Some of the children who we had initially predicted would be As or Cs tested opposite to prediction while others fell into an intermediate (B) category. To complicate the story further, many of our initial one-year-old recruits are still too young to be tested so their competence at age three can only be guessed at. Two more tables are therefore presented in this Chapter. Table IV-1 shows the categories of tested competence (A, B, and C) into which children initially predicted to be A and C actually fell (the criteria for tested competence levels are discussed in Tables II-2,7, Chapter II). Finally Table IV-2 shows the present design of the study -- that is the distribution of Subjects on which all the analyses of the present report are based. In this Table the higher ranking B Subjects shown in Table IV-1 are grouped with A Subjects and the lower ranking B Subjects are grouped with Cs. This decision to amalgamate groups was taken in order to balance the cell sizes and increase the number of Subjects for the analysis of variance. But, it cannot be stressed too strongly that the groups of working-class As and Cs among the one-year-old starters are highly tentative and that their data must be viewed with the greatest caution until the competence levels of all the one-year-old starters can be definitely established.

Table I-3a

Ideal distributions of Subjects at recruitment on age when started, social class, sex, and predicted competence

	One-Year-Old Starters				Two-Year-Old Starters				
	Middle-Class		Working-Class		Middle-Class		Working-Class		Totals
	boys	girls	boys	girls	boys	girls	boys	girls	
A	3	3	3	3	3	3	3	3	24
C	3	3	3	3	3	3	3	3	24

Table I-4a

Actual distributions of Subjects at recruitment on age when started, social class, sex, and predicted competence

	One-Year-Old Starters				Two-Year-Old Starters				
	Middle-Class		Working-Class		Middle-Class		Working-Class		Totals
	boys	girls	boys	girls	boys	girls	boys	girls	
A	3	5	2	2	5	2	3	3	25
C	0	0	4	4	1	0	4	2	15

Table IV-1

Present distribution of Subjects on age when started, social class, sex, and tested competence

	One-Year-Old Starters				Two-Year-Old Starters				
	Middle-Class		Working-Class		Middle-Class		Working-Class		Totals
	boys	girls	boys	girls	boys	girls	boys	girls	
A	2	5	1	1	5	2	2	2	20
B	1	0	2	4	1	0	1	1	10
C	0	0	3	1	0	0	4	2	10

Table IV-2

Distribution of Subjects for data analysis

	One-Year-Old Starters *				Two-Year-Old-Starters				
	Middle-Class		Working-Class		Middle-Class		Working-Class		Totals
	boys	girls	boys	girls	boys	girls	boys	girls	
A	3	5	2	4	6	2	3	3	28
C	0	0	4	2	0	0	4	2	12

* The groups for the One-Year-Old Starters are highly tentative since some Subjects are too young to be definitely classified as As or Cs.

Observation Schedule: When, Who and Where we Observe

The data on the child's human environment were gathered on five separate days approximately three weeks apart, in the child's own home or neighborhood. We observed 9 children five times during each of four periods between ages one and three (at 12-15 months, 18-21 months, 24-27 months, and 30-33 months), 11 children during three periods between ages one and three (at 12-15, 18-21, and 24-27 months)[3] and twenty children during two periods between ages two and three (at 24-27 months and 30-33 months).[4]

Our visits were made at various times of the day between 9 a.m. and 5 p.m. Monday through Friday. To ensure our observing a variety of activities and people interacting with the child, one of the five visits was usually scheduled for lunch time, two were scheduled for the morning, and two were scheduled for the afternoon. We also tried to make sure that our observations did not altogether coincide with the television program "Sesame Street" since some of our children were avid "Sesame Street" fans and while they watched the program real people were no match for Big Bird, Oscar, or the Cookie Monster. In addition, we tried to schedule each child's observations to reflect the relative amount of time he was normally in the charge of his mother or some other regular caretaker, with the proviso that no child was recruited to our study if we knew that his mother was not normally at home at least three out of five weekdays. Actually, because of emergencies or last-minute changes in the mother's plans, we did not always know who would be taking care of the child when we made our visits. As it turned out for most of these children the mother was always the child's caretaker; in the case of a few children, the mother was not in charge of the child during 75% to 99%

of our observations and in the case of another few children, she was not in charge of the child during 50 % to 74 % of our observations (reflecting the fact that these particular children were regularly cared for by babysitters). More detailed information on the nature of the child's caretaker is given in Table IV-3 .

We have previously mentioned that we limited our observation to weekdays from 9 a.m. to 5 p.m. This limitation probably means that our data underrepresents the influence on the child of fathers and older siblings who are not usually at home during this period. We probably also miss some of the more exciting and unusual places which the child visits since trips to such places are likely to be reserved for weekends. Despite these constraints, the range of people, places, and things which we actually sampled in our observation is quite extraordinary.

We have seen children interacting with mothers and fathers, grandmothers and grandfathers, aunts and uncles, brothers and sisters, babies and pets; friends of parents, friends of older siblings, friends their own age; babysitters, cleaning women, deliverymen, repairmen, storekeepers, and strangers on the street. We have followed children into living rooms, bedrooms, bathrooms, kitchens, basements, attics, backyards and front gardens; into the homes of neighbors, community rooms, playgrounds, parks, down the block, and on busy highways; into offices, stores, museums, schools, and on bicycles, cars, and trailers. We have seen these children engage in an astounding array of activities. These include eating, bathing, dressing, and going to the potty; swinging, sliding, exercising and dancing; playing with small toys such as tricycles, carts, motor scooters, and rocking horses; with small household items such as knives, ashtrays, pots, rice and spaghetti; with large household items such as vacuum cleaners, record players, barrels, and boxes; with animals

Table IV-3 Distribution of Subjects on Varying Percentages of Observations During Which Mother was the Main Caretaker

% Observations in which Mother is caretaker	Middle-Class As				Working-Class As				Working-Class Cs			
	12-15*	18-21*	24-27*	30-33*	12-15	18-21	24-27	30-33	12-15	18-21	24-27	30-33
100%	4	7	10	7	6	6	9	6	6	5	11	5
75% - 99%	3	0	1	5	0	0	1	2	0	0	1	1
50% - 74%	0	0	5	2	0	0	0	0	0	1	0	0
25% - 49%	1	1	0	1	0	0	1	0	0	0	0	0

* months. Every 3 months is a new phase of observation, beginning at 12-15 mos. for one-year-old starters and 24-27 months for two-year-old starters.

such as horses, dogs, cats, frogs, and cockroaches; and with natural objects such as grass, stones, mud, sand, and water. In view of this fantastic array of settings and stimuli we are almost thankful for the few constraints on data collection that we did reluctantly impose on ourselves. Without these limitations, comprehensiveness of coverage might easily have degenerated into chaos.

Method of Observation: Who Observes and How They Observe[5]

The observers in our Environment group are five females with graduate degrees in Education or Psychology. Their backgrounds are varied: one observer comes from a large city in China, and is of middle-class background; one is Protestant, American, from a large city in the Midwest, and of working-class background; one is Catholic, from a small city in the West Indies, and of middle-class background, one Protestant, American, from a small city in the East, and of middle-class background; and one is Catholic, from a rural area in the Midwest and of working-class background. We consider this diversity in the backgrounds of our observers a great asset since it ensures that our data will be collected and interpreted from a variety of cultural perspectives.

In making our observations, we capitalized on cultural differences in our staff by rotating visits among our observers. Thus, the typical child is visited by four different observers and by one of them twice. When the observer visits the home she usually stays one to one-and-a-half hours and collects data relevant to three different scales: Three ten-minute observations for the Object Interaction Scale, and one ten-minute interview for the Typical Day Questionnaire (See Appendix for details of the Scales). For the Human Interaction Scale the observers dictate into a small tape recorder a running commentary describing the behavior of the child and others who interact with him; this commentary is coded as soon as possible after the visit is completed. For the Object Interaction Scale the observer uses a special coding sheet and tries to code on the spot; she observes the child's behavior for 15 seconds, then writes and codes what she has observed during the next 15 seconds, repeating this alternating sequence for ten minutes. For the Typical Day Questionnaire the Observer interviews the mother and asks her to recall the child's activities of the preceding 24 hours. The observer probes the mother concerning each half hour or so of the preceding day -- where the child was, whom he was with, what he was doing, and what she, the mother, was doing. The Human Interaction and Object Interaction observation in the visit are alternated, and the visit ends with the Typical Day interview.

Possible sources of error in our findings

Before presenting our findings we must remind the reader of their preliminary and tentative nature and also point out some possible sources of error. One major source of error is inherent in all observational research in which the observer is not concealed. This has to do with the effect of the observer himself on the data he gathers. Specifically in our own study, there is very likelv a tendency on the part of mothers and other people to interact more with the child and to do so in more "suitable" ways when we are in the home than when we are not there. Admittedly, in our study it would be extremelv difficult for a mother to keep up a totally artificial front considering that she receives a visit from someone connected with the Pre-school project almost every week for three months running and this cycle is repeated as much as four times over the course of two years. Nevertheless, it is still likely that she will try to make a good impression, and this biases our findings to some degree. We have no wav of knowing how much this distortion occurs or how it may vary from mother to mother, but our guess is that the true figures for such items as the quantity of mother-child interaction and the frequency of "intellectual" activities really may be somewhat lower than the estimates derived from our study.

Another important source of error affecting our findings is the imperfect reliability of our scales. Agreement between pairs of observers after observing the same child and coding their data average 76-87% for the dimensions of the Human Interaction Scale discussed in this report. This degree of agreement compares well to that reported by other researchers conducting similar observational studies but it is nevertheless far short of perfect. Fortunately, our method of rotating observations of each child among several observers mitigates this unreliability to some extent; no one child is victimized by the personal bias or other shortcomings of any one observer.

A third source of bias has to do with the conceptual basis of the scales themselves. We have made this conceptual basis quite explicit in Chapter III, but here we want to acknowledge that there is nothing inherently correct about the scale categories we chose to use. With a different orientation we might quite easily have developed a different set of scales, applied them to our data, and come up with a different set of results. In interpreting our findings the reader should constantly bear in mind the value judgments implicit in our scales and our specific definitions of terms.

Methods of Data Analysis

The data may be analyzed in several different ways which vary by Subject groupings, the way the raw data is treated, the number of different people covered by the term "interactor," and the statistical technique applied. The principal method of analysis that we use in this report takes the following form:

1. Age groups. The data for the twenty Subjects in our sample who started in our study at age two are analyzed separately from the sample of twenty begun at age one. There are several reasons for this. First, the two-year-old starters were classified as As or Cs in intellectual competence on the basis of test performance at older ages (27, 30, and 36 months) than the one-year-old starters (21, 24, and 27 months). This means that so far as this study is concerned, the classification of the two-year-old starters may be considered final, whereas the classification of the one-year-old starters is highly tentative and subject to change when all of these subjects are finally tested at age three.

Second, the two-year-old starters were observed over a different period of time than most of the one-year-old starters (24-27 and 30-33 months instead of 12-15, 18-21, and 24-27 months). Although the two periods partially overlap and some of the one-year-old starters were observed during all four periods, there are not enough of them to make a pooling of one- and two-year-old starters feasible.

Third, and perhaps most important, our data strongly suggests an observer effect working in favor of the one-year-old starters. It seems that the mere fact of being involved in our study from age 12 to 24 months may have worked to improve the environments, the experiences, and apparently, the competence levels of our one-year-old starters relative to our two-year-old starters. This is a most remarkable finding in itself and will be discussed in a later publication when the final results for the one-year-old starters become available.

2. Competence and Social Class. Sixteen of the 40 Subjects in our sample are from Hollingshead and Redlich's Classes I and II (hereafter called "middle class") and 24 are from Classes III, IV, and V (hereafter called "working

class"). However, as previously discussed, the social class variable is confounded with competence in that all of our middle-class Subjects are A children, while our working-class Subjects are divided between As and Cs. To overcome this confounding only one solution seems feasible. This is to compare separately middle-class As with working-class Cs, middle-class As with working-class As, and working-class As with working-class Cs. These comparisons present the following interpretations:

Middle-Class As versus Working-Class Cs. Differences in experience of these two groups may be related to differences in either social class or competence or both.

Working-Class As versus Working-Class Cs. Differences in experience of these two groups are chiefly related to differences in competence.

Middle-Class As versus Working-Class As. Differences in experience of these two groups are chiefly related to differences in social class.

The detailed distribution of A and C Subjects on social class and other family characteristic variables is given in Table IV-4. The Table shows that the middle-class A groups are of course much higher than the working-class A and C groups on the indices of father's education, occupation and family residence that enter into the Hollingshead and Redlich's class hierarchy (all the middle-class Subjects belong to Classes I and II). They also differ from the working-class Subjects on a number of other variables: they have smaller families (an average of 5 instead of 3), they are nearly all of Protestant or Jewish religious background (though many are now agnostics or non-practicing), and most particularly, the education of the mother is typically considerably higher than that of mothers in the working-class. On the other hand, the family background of the working-class As and Cs seem fairly well matched. In terms of Hollingshead and Redlich's status designations, the As and Cs correspond quite closely, each group having roughly the same number of families in Classes III, IV and V. But there are, of course, some dissimilarities. Of these the most important seems to be the education of mothers. Among the working-class one-year-old starters, mother's education seems nicely matched, but among the two-year-old starters the mothers of the working-class As are generally more highly educated than those of the working-class Cs, a point we shall return to in our final discussion of results.

3. *Raw Data Treatments*. Most of the raw data on the environment is coded in terms of amount of time spent by the child on specific categories of interaction with other people. These category times are totalled over the course of five observations spaced over a three-month cycle, and are then converted to percentages of either *observation* time (which is constant for all Subjects) or of *total interaction* time (which varies from Subject to Subject).

A concrete example may make the distinction between these two treatments of raw data clearer. Suppose each child in the study is observed for 1000 seconds. Suppose further that children in group X spend a mean of 500 seconds of observation time interacting with other people which includes 250 seconds spent on "highly intellectual" activities. In contrast, group Y spends a mean of 100 seconds interacting with other people and 50 seconds on highly intellectual activities. If the raw data are treated as *percentages of observation time* then Group X will be found to spend five times as much on highly intellectual activities as group Y (25% of observation time versus 05%). If the raw data is treated as *percentages of interaction time*, then group X and Y will be found to spend an equal proportion of time in highly intellectual activities (50% each).[6]

These two contrasting treatments of the raw data are appropriate for different purposes. The conversion into percentages of observation time tells

Table IV-4

Sample Characteristics - Income, Education, Occupation, Ethnicity, Religion, Number of Children in Family

Two-Year-Old Starters

Subject I.D.#	HR SES[c]	Family Income	Mother Education	Father Education	Mother Occupation[a]	Father Occupation[b]
Test Performance A						
Prediction A						
02	MC	$3000-$7000	Partial or Jr. College	Post College Graduate	None	Medical Student
05	MC	20000 or over	Partial or Jr. College	Post College Graduate	Nurse	Psychoanalyst
09	MC	7000-12000	Post College Graduate	Post College Graduate	Social Worker	University Professor
10	MC	20000 or over	Post College Graduate	Post College Graduate	Teacher	Lawyer
12	MC	12000-20000	Post College Graduate	Post College Graduate	Pre-natal Teacher	Physician
13	MC	20000 or over	Post College Graduate	Post College Graduate	(College Teacher)	Physician
21	MC	12000-20000	College Graduate	Post College Graduate	None	Lawyer
22	WC	3000-7000	Partial or Jr. College	College Graduate	Cocktail Waitress	(City Regional Planner)
35	WC	7000-12000	Partial or Jr. College	Partial or Voc. Col.	(Lab Technician)	Sr. Lab Technician
40	WC	7000-12000	Partial or Jr. College	High School Grad.	None	MBTA Bus Driver
Prediction C						
25	WC	3000-7000	High School Graduate	Partial High School	None	Painter
Test Performance B						
Prediction A						
18	WC	7000-12000	Partial or Jr. College	Partial or Voc. Col.	None	TV Repair Shop Owner
36	WC	-	High School Graduate	Partial or Voc. Col.	None	Industrial Tool Salesman
Prediction C						
33	MC	20000 or over	Partial or Jr. College	Post College Graduate	None	Executive, Shoe Manufacturing
Test Performance C						
Prediction A						
37	WC	3000-7000	Partial or Jr. College	High School Graduate	None	Travel Agent
Prediction C						
07	WC	3000-7000	Partial High School	Jr. High Graduate	Waitress	Steelworker
14	WC	3000-7000	Partial High School	Partial High School	(Hairdresser)	MBTA Bus Driver
27	WC	7000-12000	Partial or Jr. College	College Graduate	None	(Antique dealer)
28	WC	3000-7000	Jr. High Graduate	Partial or Voc. Col.	None	Accountant
30	WC	12000-20000	Jr. High Graduate	Partial High School	Maintenance Ct. House	Ct. Officer

Subject I.D.#	HR SES[c]	Mother Ethnic[d]	Father Ethnic	Mother Religion[c]	Father Religion	Number of Children in Family
Test Performance A						
Prediction A						
02	MC	WASP	WASP	Protestant	Protestant	2
05	MC	WASP	WASP	Catholic	Episcopalian	3
09	MC	WASP	Spanish	None(unitarian)	None(Catholic)	1
10	MC	Jewish	Jewish	Jewish	Jewish	3
12	MC	Jewish	Jewish	Jewish	Jewish	4
13	MC	WASP	Jewish	Protestant	Jewish	3
21	MC	WASP	WASP	Protestant	Protestant	2
22	WC	WASP	WASP	None(Catholic)	None(Catholic)	3
35	WC	WASP	WASP	Catholic	Catholic	6
40	WC	Irish	Irish	Catholic	Catholic	2
Prediction C						
25	WC	WASP	WASP	None	None	2
Test Performance B						
Prediction A						
18	WC	Italian	Italian	Catholic	Catholic	7
36	WC	Italian	Italian	Catholic	Catholic	2
Prediction C						
33	MC	Jewish	Jewish	Jewish	Jewish	3
Test Performance C						
Prediction A						
37	WC	Latin-American	Latin-American	Catholic	Catholic	6
Prediction C						
07	WC	WASP	WASP	Protestant	Protestant	6
14	WC	Irish	Irish	Catholic	Catholic	2
27	WC	Greek	Irish	Greek Orthodox	None(Catholic)	3
28	WC	Italian	Italian	Catholic	Catholic	2
30	WC	Irish	Irish	Catholic	Catholic	7

Table IV-4

Sample Characteristics - Income, Education, Occupation, Ethnicity, Religion, Number of Children in Family

One-Year-Old Starters

Subject I.D.#	HR SES[c]	Family Income	Mother Education	Father Education	Mother Occupation[a]	Father Occupation[b]
Test Performance A						
Prediction A						
03	MC	$20000 or over	College Graduate	Post College Graduate	Secretary	Chemist
08	MC	Less than $3000	Post College Graduate	Post College Graduate	Teacher	Ph.D. Student
11	MC	$12000-$20000	College Graduate	Post College Graduate	None	University Professor
17	MC	20000 or over	College Graduate	Post College Graduate	None	Physicist
19	MC	12000-20000	Partial or Jr. College	Post College Graduate	None	University Professor
20	MC	12000-20000	Post College Graduate	Post College Graduate	(Teacher)	Architect
24	MC	20000 or over	Post College Graduate	Post College Graduate	None	University Professor
16	WC	7000-12000	Partial or Jr. College	Partial or Jr. College	None	Physical Ed. Teacher
Prediction C						
01	WC	7000-12000	High School Graduate	High School Graduate	None	Maintenance Man
Test Performance B						
Prediction A						
31	MC	12000-20000	Post College Graduate	Post College Graduate	Restaurant Manager	Restaurant Owner
39	WC	7000-12000	Partial or Jr. College	College Graduate	None	Bank Treasurer
32	WC	3000-7000	High School Graduate	Partial High School	None	Owns small repair shop
Prediction C						
06	WC	7000-12000	Less than 6 yrs. Sch.	Elementary School	None	Restaurant Baker
41	WC	7000-12000	Partial High School	Junior High Graduate	None	Crane Operator
42	WC	Under $3000	Partial High School	-	-	-
43	WC	7000-12000	High School Graduate	Partial or Voc. Col.	None	Hairdresser
Test Performance C						
Prediction A						
44	WC	7000-12000	Partial High School	High School Graduate	None	Owner of small catering service
Prediction C						
38	WC	Under $3000	Partial or Jr. College	-	None	(Professional soldier)
34	WC	7000-12000	Partial High School	High School Graduate	None	Truck driver liquor deliveries
45	WC	7000-12000	High School Graduate	High School Graduate	(Bookkeeper)	Route service canteen filler

Subject I.D.#	HR SES[c]	Mother Ethnic[d]	Father Ethnic	Mother Religion[e]	Father Religion	Number of Children in Family
Test Performance A						
Prediction A						
03	MC	WASP	Jewish	None(Protestant)	None	2
08	MC	WASP	WASP	Protestant	Protestant	1
11	MC	Irish	WASP	None	None	2
17	MC	WASP	WASP	None	None	2
19	MC	WASP	WASP	Protestant	Protestant	3
20	MC	Jewish	WASP	Jewish	Jewish	4
24	MC	WASP	Jewish	Protestant	Jewish	4
16	WC	WASP	WASP	Catholic	Catholic	3
Prediction C						
01	WC	Italian	Italian	Catholic	Catholic	13
Test Performance B						
Prediction A						
31	MC	Italian	Italian	Catholic	Catholic	3
39	WC	WASP	Irish	Catholic	Catholic	3
32	WC	Irish	Italian	Catholic	Catholic	8
Prediction C						
06	WC	Afro-Latin Amer.	Afro-Latin Amer.	Jehovah's Witness	Jehovah's Witness	5
41	WC	WASP	WASP	Catholic	Protestant	3
42	WC	-	-	-	-	-
43	WC	Jewish	Jewish	Jewish	Jewish	3
Test Performance C						
Prediction A						
44	WC	WASP	WASP	Catholic	Catholic	2
Prediction C						
38	WC	WASP	WASP	Catholic	-	3
34	WC	WASP	WASP	Catholic	Catholic	3
45	WC	WASP and Irish	Italian	Catholic	Catholic	3

Footnotes for Table IV-4

[a] Parentheses denote Mother's occupation prior to our study. Present occupations are part-time.

[b] Parentheses used when parents are divorced and Mother is head of household

[c] Classification for data analysis. MA = middle-class A, WA = working-class A, WC = working-class C

[d] WASP used to mean of European background other than Irish, Italian, Jewish Spanish, or Greek

[e] Parentheses denote religious background where parents no longer profess a religious faith

us how much of the child's waking day is devoted to different types of interaction with others (assuming our observations are representative of the child's waking hours). This treatment is appropriate for investigating relationships between the sheer amount of time the child spends on different types of interaction and his development. The conversion of the raw data into percentages of interaction time tells us how the total interaction time the child spends with other people is allocated. This treatment is suitable for testing the relationship between the characteristic quality of the child's interaction with other people (regardless of quantity) and his development, and it also helps to control for the effects of social class since, as we shall see, middle-class children on an average enjoy a significantly greater quantity of interaction with other people than do working-class children.

We have chosen to convert the raw data to percentages of observation time for our major method of data analysis. But the data has also been analyzed using percentages of interaction time and these results will be briefly discussed in the text.

4. Definition of the term "Interactor." In the course of our observations we have seen Subjects interacting with a variety of people -- mothers, fathers, babysitters, other adults, siblings, playmates, and so on. Our data can be broken down into several categories of interactors, but only one seems to occur frequently enough and generally enough to be analyzed separately -- namely the child's mother or principal caretaker.

Our principal method of data analysis will consider the role of all interactors -- adult or child -- as if they were equivalent. Later a subsidiary analysis will consider the role of the child's principal caretaker -- normally his mother -- and compare these results with that of the primary analysis.

5. Statistical Technique. The data are analyzed by means of analysis of variance with repeated measures. The dependent variables (categories of interaction between the child and his environment) are measured at three periods for the one-year-old starters (12-15, 18-21, and 24-27 months) and at two periods for the two-year-old starters (24-27 and 30-33 months). F ratios are computed for subject groupings (a mixed competence/social class dimension), for periods of observation, and for the interaction between these terms. In addition, t tests are calculated for the difference between middle-class As and working-class As, middle-class As and working-class Cs, and working-class As and working-class Cs. The t tests use Welch's procedure (see Winer, 1962, p. 37) for testing the difference between two means which corrects for heterogeneity of variance by sharply decreasing the degrees of freedom. Except for the small number of items for which we had directional hypotheses (see below) the p values are for two-tailed tests. With small n's and degrees of freedom reduced even further by the very conservative Welch formula, it seems reasonable for us to regard unhypothesized differences between groups with p values close to .10 as worth talking about and we shall use this value as a rough guide in sorting out the results.

Hypotheses

The most important items of the Human Interaction Scale are those dealing with the quality of the child's interaction with other people and the technique of interaction which the other person uses. In the Human Interaction Scale interactions are coded and clustered according to content and their judged value for the child's intellectual or social development.

Simultaneously, the interactor's styles of interacting (Techniques) are coded and clustered according to major types. These include participation, facilitation, observation and restriction of the child's activities by the other person. If the child's interactions with humans do make a difference to his intellectual development and if active involvement by humans in the child's experiences intensifies these experiences, than we should expect to find significant differences between A and C children in those interactions with other people that we judge *a priori* are most likely to promote his intellectual development. This basic expectation can be stated in terms of three hypotheses:

1. *Other people will spend more time with A than with C children in interactions of high intellectual value* regardless of the specific techniques of interaction used by these people.

2. *Other people will spend more time with A than with C children actively participating in interactions of high intellectual value*. (The other person actively participates in the child's activity when he uses techniques of teaching, justifying, conversing, entertaining, or joining in.)

3. *Other people will spend more time encouraging interactions of high intellectual value in A than in C children*.

Strictly, these hypotheses should apply with equal rigor to the findings for the one-year-old starters as to the results for the two-year-old starters. But as we have noted several times, the status of the working-class one-year-old starters as As and Cs is very ambiguous at the present time, and since their test results do not show any clear cut difference in competence between the "As" and "Cs" it is illogical to expect much difference in their prior experiences. Therefore, in the discussion of results that follow we shall focus attention predominantly on the results for the two-year-old starters whose competence classifications are definite and not subject to change within the lifetime of this project.

Results: Two-Year-Old Starters

Middle-Class As versus Working-Class Cs

Table IV-5 and IV-6 list the means for the analysis of variance and the results for the F and t tests for variables dealing with the quantity, quality, and style of the child's interaction with others.

Quantity of Interaction. Table IV-5 shows many striking differences between middle-class A and working-class C children. The first is that middle-class A children spend much more time interacting with other people than working-class C children (averaging over the two observation periods the means are 44% and 31%, $t = 2.72$; $p < .05$, see Table IV-6). This difference in sheer quantity of interaction is already large during the first observation period, 24-27 months (43% versus 32%) and increases slightly during the subsequent observation period (44% versus 31%). Put in more everyday language these figures mean that people who come into contact with the middle-class A child spend, on an average, 26 minutes out of every observation hour attending to him while those in contact with the lower-class C child spend about 19 minutes. This attention may take the form of direct participation in the child's activities, or it may be more indirect as for example, when a mother facilitates her child's activity by supplying needed materials, or merely observes this activity, or even restricts it. Nevertheless, the contrast in sheer quantity of interaction -- attention to the child, if you will -- is compelling. And its significance deepens when we realize that the quality of interaction experienced by the two groups also differs profoundly.

Quality of Interaction: Value and Content. Tables IV-5, 6, 7, 8 show striking differences in the quality of the interactions experienced by middle-class As and working-class Cs. The former group spends over twice as much time as the latter involved in interactions judged highly likely to promote their intellectual development (averaging over the two periods: 10.8% versus 4.3%; $t = 3.01$; $p < .05$.) This difference in favor of the As is apparent at 24-27 months (7% versus 2%) and increases dramatically by 30-33 months (15% versus 6%). At 30-33 months the middle-class A child spends nine minutes out of an observation hour involved in interactions of high intellectual value while the working-class child spends less than four minutes.

Next, complementing the first result, we find that middle-class As spend more time than working-class Cs in interactive play of moderate intellectual value (10% versus 6.5%, averaging over the two observation periods; $t = 3.89$; $p < .01$), but this difference in favor of the As decreases as the middle-class child grows older and shifts more and more to richer intellectual pursuits. By age 30-33 months the difference between the As and Cs on time spent on"moderately intellectual" interactions has been halved while the difference between the groups on "highly intellectual" interactions has doubled.

So far our comparison of As and Cs has dealt with differences in interactions that relate to the child's intellectual development. Let us now consider another group of interactions -- those that are judged in the Human Interaction Scale to be relevant primarily to the child's social and emotional development. Three categories are coded here: activities characterized by positive social/emotional expression (especially roughhousing, play-fighting and social games, but including also the expression of affection and kindness,); activities characterized by negative social/emotional expression (e.g. the expression of hostility, tantrumming); and activities characterized by more neutrally-valued social/emotional expression (e.g. politeness and the expression of the need for security or social contact). The means for the analysis

Table IV-5 Two-Year-Old Starters: Comparison of As and Cs on the Intellectual and Social Value of their Interactions with Others

Means

	Middle-Class A[a]			Working-Class A			Working-Class C		
	n=8			n=6			n=6		
	Observation Period			Observation Period			Observation Period		
		(months)			(months)			(months)	
Value of Interaction[b]	24-27	30-33	$\bar{X}$ of 2 Periods	24-27	30-33	$\bar{X}$ of 2 Periods	24-27	30-33	$\bar{X}$ of 2 Periods
Intellectual Value									
High	6.8[c]	14.8	10.8	7.9	15.6	11.7	2.4	6.2	4.3
Moderate (converse)	5.7	4.9	5.3	5.0	3.1	4.1	6.7	4.4	5.5
Moderate (play)	12.2	8.1	10.2	10.1	7.5	8.8	7.4	5.7	6.5
Low (basic care)	11.0	8.6	9.8	9.7	5.3	7.5	9.5	6.0	7.7
Low (gross motor)	4.0	2.8	3.4	5.8	0.8	3.3	2.5	1.2	1.8
Low (unspecific)	0.2	0.2	0.2	0.7	0.2	0.4	0.3	0.8	0.6
Social Value									
Positive	0.1	0.5	0.3	0.3	1.2	0.8	0.3	3.4	1.8
Neutral	0.0	1.0	0.5	0.4	0.3	0.3	0.2	0.5	0.4
Negative	2.3	2.9	2.6	2.0	1.8	1.9	2.1	2.3	2.2
Total Interaction	43.0	44.1	43.6	42.1	36.2	39.1	31.7	30.7	31.2

[a] Middle-class children are from Hollingshead-Redlich Classes I and II.
Working-class children are from Hollingshead-Redlich Classes III, IV, and V.

[b] Evaluative criteria are described in the manual in the Appendix.

[c] The amount of time spent by each Subject in interactions of specified value is summed over the five observations of a three-month period then converted to a percentage of total observation time for that period (usually 9000 seconds). Each entry is an average of percentages for individual S's.

Table IV-6 Two-Year-Old Starters: Comparison of As and Cs on the Intellectual and Social Value of their Interactions with Others

STANDARD DEVIATIONS AND RESULTS OF F AND T-TESTS

Value of Interaction	F groups[a]	F periods	F gps. X per.	Standard Deviations[b] MA	Standard Deviations[b] WA	Standard Deviations[b] WC	MA vs WA t[c]	MA vs WA df[d]	MA vs WC t	MA vs WC df	WA vs WC t	WA vs WC df
Intellectual Value												
High	2.8*	16.0***	0.7	5.6	8.1	1.0	0.2	11	3.0**	5	2.0**	5
Moderate (converse)	0.4	4.2*	0.3	3.2	2.7	3.1	0.7	12	0.1	12	0.8	10
Moderate (play)	2.0	3.2	0.2	2.3	4.8	0.7	0.6	9	3.9***	6	1.1	5
Low (basic care)	1.5	10.5***	0.3	3.0	1.2	2.5	1.8	7	1.3	12	0.2	7
Low (gross motor)	0.4	3.2*	0.8	2.7	4.4	1.6	0.0	10	1.2	10	0.7	6
Low (unspecific)	1.2	0.0	1.2	0.2	0.6	0.4	0.8	9	1.9*	10	0.4	9
Social Value												
Positive	1.4	4.4*	1.4	0.2	0.8	2.7	1.3	8	1.2	7	0.8	6
Neutral	0.0	0.8	0.6	1.3	0.4	0.5	0.3	6	0.2	7	0.1	9
Negative	0.4	0.2	0.2	1.9	1.1	1.1	0.9	10	0.5	9	0.4	10
Total Interaction	2.4	0.8	0.9	10.4	11.3	5.2	0.7	12	2.7**	8	1.4	7

[a] The groups are Middle-class A's, Working-class As, and Working-class Cs.

[b] Standard Deviation of the averages calculated for each S over two observation periods.

[c] Means of individual S's averages over two observation periods are compared.

[d] Degrees of freedom change to adjust for heterogeneity of variance.

*p < .10, **p < .05, ***p < .01. The p values are for two-tailed t-tests except for comparisons of As and Cs on interactions of high intellectual value where the t-tests are one-tailed.

Table IV-7 Two-Year-Old Starters: Comparison of As and Cs on Interactions that Differ in Content But are Alike in Intellectual Value

MEANS

Content of Interaction[b]	Middle Class A[a] n=8 Observation Period (months) 24-27	30-33	$\bar{X}$ of 2 Periods	Working Class A n=6 Observation Period (months) 24-27	30-33	$\bar{X}$ of 2 Periods	Working Class C n=6 Observation Period (months) 24-27	30-33	$\bar{X}$ of 2 Periods
High Intellectual									
Verbal, Symbolic	4.0[c]	4.1	4.0	3.1	6.0	4.6	0.6	1.6	1.1
Spatial, Perceptual	0.5	5.0	2.8	1.6	4.1	2.8	0.2	2.3	1.2
Concrete Reasoning	0.1	0.5	0.3	1.2	1.5	1.3	0.6	0.5	0.5
Expressive Skills	1.4	2.5	1.9	0.4	2.2	1.3	0.2	1.2	0.7
Executive Skills	0.8	2.8	1.8	1.6	1.8	1.7	0.8	0.7	0.7
Total-High	6.8	14.8	10.8	7.9	15.6	11.7	2.4	6.2	4.3
Moderate Intellectual									
Explore Household	6.7	4.1	5.4	4.1	2.6	3.3	4.1	3.2	3.7
Play Toys	5.5	3.6	4.6	5.2	4.4	4.8	3.3	2.4	2.8
Explore Nature	0.0	0.3	0.2	0.9	0.5	0.7	0.0	0.1	0.0
Total-Moderate	12.2	8.1	10.2	10.1	7.5	8.8	7.4	5.7	6.5

[a] Middle-class children are from Hollingshead-Redlich Classes I and II.
Working-class children are from Hollingshead-Redlich Classes III, IV, and V.

[b] Coding criteria for categories are described in the manual in the Appendix.

[c] The amount of time spent by each Subject in interactions of specified value is summed over the five observations of a three-month period then converted to a percentage of total observation time for that period (usually 9000 seconds). Each entry is an average of percentages for individual Ss.

Table IV-8 Two-Year-Old Starters: Comparison of As and Cs on Interactions that Differ in Content but are Alike in Intellectual Value

STANDARD DEVIATIONS AND RESULTS OF F AND T-TESTS

Content of Interaction	F groups[a]	F periods	F gps. X per.	Standard Deviations[b] MA	WA	WC	MA vs WA t[c]	df[d]	MA vs WC t	df	WA vs WC t	df
High Intellectual												
Verbal, Symbolic	1.8	1.7	0.7	2.6	5.2	0.6	0.2	9	2.8**	6	1.5*	5
Spatial, Perceptual	0.7	4.8**	0.3	2.9	3.3	0.8	0.0	12	1.3	6	1.0	6
Concrete Reasoning	13.1***	0.6	0.6	0.2	0.5	0.3	4.2***	8	1.7*	10	2.9**	8
Expressive Skills	1.2	3.0	0.1	1.9	0.7	0.7	0.8	7	1.5*	7	1.3	10
Executive Skills	1.6	1.5	1.3	1.7	0.6	0.4	0.1	7	1.6*	6	3.0***	8
Total-High	2.8*	16.0***	0.7	5.6	8.1	1.0	0.2	11	3.0**	5	2.0**	5
Moderate Intellectual												
Explore Household	2.5	4.2*	0.4	2.0	2.0	0.6	1.8*	12	2.2*	6	0.4	6
Play Toys	1.4	1.1	0.1	1.7	3.2	0.9	0.1	9	2.4**	9	1.3	6
Explore Nature	2.3	0.0	0.9	0.4	0.9	0.1	1.3	9	0.7	5	1.7	5
Total-Moderate	2.0	3.2*	0.2	2.3	4.8	0.7	0.6	9	3.9***	6	1.1	5

[a] The groups are Middle-class As, Working-class As, and Working-class Cs.

[b] Standard deviation of the averages calculated for each S over two observation periods.

[c] Means of individual S's averages over two observation periods are compared.

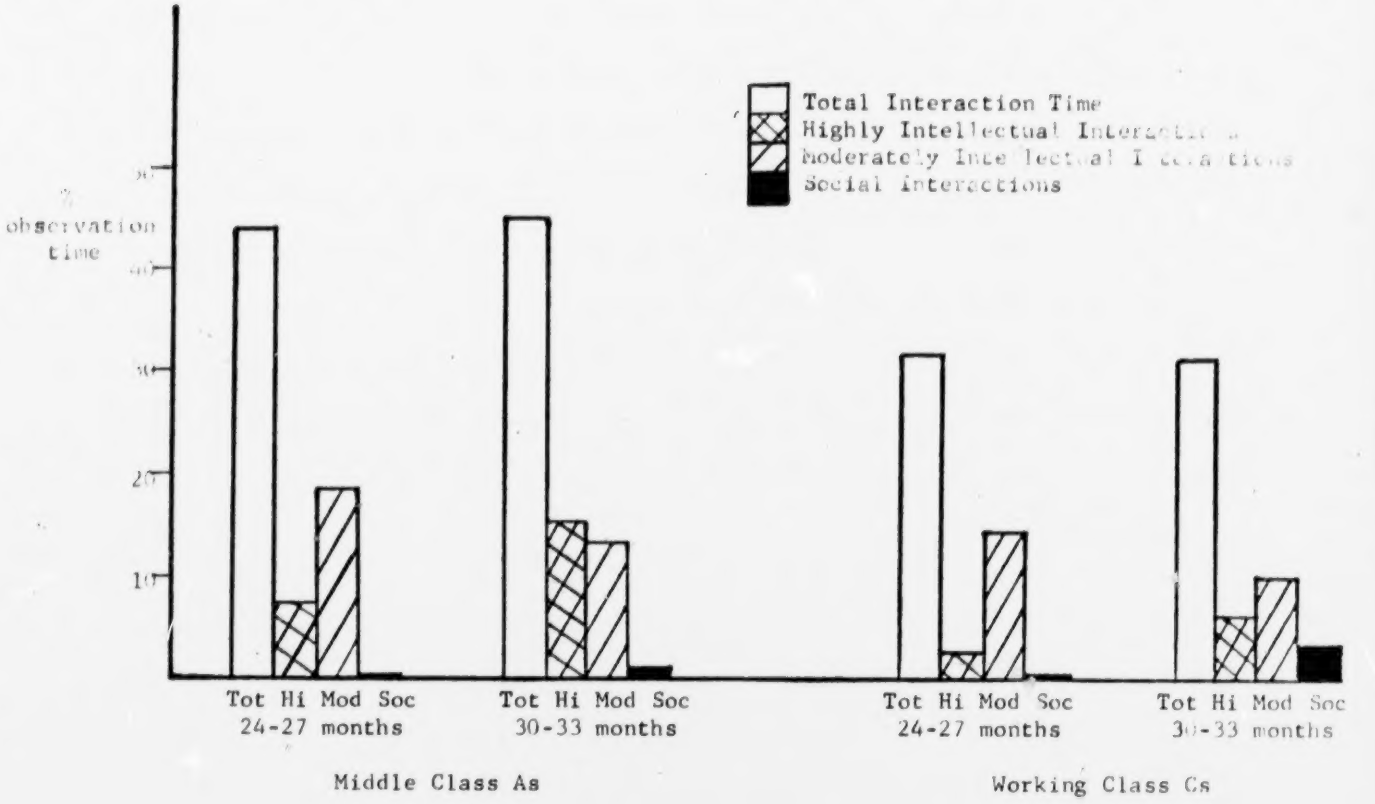
[d] Degrees of freedom change to adjust for heterogeneity of variance.
*p < .10, **p < .05, ***p < .01. The p values are for two-tailed t-tests except for comparisons of As and Cs on interactions of high intellectual value where the t-tests are one-tailed.

of variance for these three types of social activities are given in Table IV-5 and the F and t tests in Table IV-6.

Table IV-5 shows some interesting differences between the middle-class As and working-class Cs which beautifully complements our previous findings. In striking contrast to our findings for "highly intellectual" interactions is the fact that working-class C children seem to spend more time than middle-class As in positive social-physical interactions, especially those involving roughhousing and social games, and this difference in favor of the Cs increases as the children grow up. At 24-27 months both the working-class Cs and the middle-class As spend negligible amounts of time on this type of social activity (0.3% versus 0.1%), but by 30-33 months the working-class Cs have stepped up their social interactions and spend seven times as much time on them as the middle-class As (3.4% versus 0.5%).

We can summarize the data we have so far presented on the differences in the quality of interaction of middle-class As and working-class Cs by referring to Figure IV-1. Figure IV-1 highlights two outstanding aspects of our results. First, that middle-class A children spend much more time interacting with other people than working-class C children. Second, that as the middle-class A child grows older, more and more time is shifted from activities of less intellectual value to activities of more intellectual value. Thus, at age 30-33 months, 30 times as much time is devoted to interactions that are highly likely to promote this child's intellectual development as is spent on social-physical interactions (15% versus 0.5%), and nearly twice as much time is spent on activities of high intellectual value as is spent on activities of moderate intellectual value (15% versus 8%).

Figure IV-1



Two-Year-Old Starters: Comparison of Middle-Class As and Working-Class Cs on the Quality of their Interaction with Others

The situation is dramatically different for the working-class C child. This child's interactions also change to incorporate more highly intellectual activities as he grows older, but there is also a distinct increase in social-physical interactions. At age 30-33 months, less than twice as much observation time is spent on interactions judged highly likely to promote his intellectual development (6.2%) as on activities of a social-physical nature (3.4%). And during the same period, the working-class C child spends almost as much time in interactive play of moderate intellectual value as on interactions of high intellectual value (5.7% versus 6.2%).

To put it succinctly, the middle-class A child has two decided advantages so far as his intellectual development is concerned. Other people devote more time to him, and they use their time more selectively to promote his intellectual advance.

Style of Interaction: Techniques. We have so far discussed the major differences between middle-class As and working-class Cs in the intellectual and social value of the child's interaction with other people. It is time now to examine differences in style, that is the other person's use of different techniques or approaches to interacting with the child. Table IV-9 and IV-10 provides the means and test results for the interactors' use of major categories of techniques, coded in the Human Interaction Scale. These are direct participation (teaching, stating reasons or justifications, conversing, joining in), facilitation (suggesting, preparing, providing materials for, praising, helping), observation and restriction (prohibiting, preventing, punishing, distracting).

Three of these four general categories of techniques seem to distinguish people who interact with middle-class As from those who are in contact with working-class Cs. Interactors with middle-class As -- their mothers, fathers, siblings, friends -- spend significantly more observation time than interactors with working-class Cs directly participating in their activities (averaging the two observation periods, 17% versus 9%; $t = 2.70$; p .05): more time facilitating their activities (15% versus 11%; $t = 1.80$; p .10); and more time carefully observing their activities (6% versus 4%; $t = 1.86$; p .10). The data just given are averages for the two observation periods at 24-27 and 30-33 months, but the pattern of differences between the two groups from period to period is also illuminating (see Figure IV-2).

Interactors with both groups, the middle-class As and the working-class Cs tend to increase time spent actively participating in the child's activity as he grows older and to decrease time spent merely facilitating or observing his activity. But we must emphasize that the superficially similar trends in the use of techniques broadly labelled "participation" masks substantial differences between the working-class Cs and middle-class As. These differences concern both the specific techniques of participation employed by interactors with the two groups and the content of activities participated in. People who participate in the activities of middle-class As more often use techniques of teaching, justifying, and conversing while those who participate in activities of working-class Cs more often merely join in these activities as a playmate. Thus, if we sum the means for the individual components of the "participation" category (see Table IV-11), we find that when the middle-class A child is 30-33 months old, other people spend 10.7% of observation time teaching, justifying, or conversing with him and only

Table IV-9 Two-Year-Old Starters: Comparison of As and Cs on General Types of Techniques Used by Others in Interacting with Them

MEANS

Type of Technique[b]	Middle Class A[a] n=8 Observation Period			Working Class A n=6 Observation Period			Working Class C n=6 Observation Period		
	24-27	(months) 30-33	$\bar{X}$ of 2 Periods	24-27	(months) 30-33	$\bar{X}$ of 2 Periods	24-27	(months) 30-33	$\bar{X}$ of 2 Periods
Direct Participation	15.5[c]	18.1	16.8	12.4	16.1	14.2	7.4	10.5	8.9
Facilitation	16.4	14.4	15.4	17.5	11.2	14.3	11.8	10.0	10.9
Observation	5.6	5.3	5.5	6.2	2.8	4.5	4.7	3.4	4.1
Restriction	5.4	5.5	5.4	5.9	5.8	5.8	7.6	6.6	7.1

[a] Middle-class children are from Hollingshead-Redlich Classes I and II. Working-class children are from Hollingshead-Redlich Classes III, IV, and V.

[b] Coding criteria for categories are described in the manual in the Appendix.

[c] For each Subject the amount of time during which the interactor used techniques belonging to the specified category is summed over the five observations of a three-month period and converted to a percentage of total observation time for that period (usually 9000 seconds). Each entry is an average of individual percentages.

Table IV-10 Two-Year-Old Starters: Comparisons of As and Cs on General Types of Techniques used by Others in Interacting with Them

STANDARD DEVIATIONS AND RESULTS OF F AND T-TESTS

	F	F	F	Standard Deviations[b]			MA vs WA		MA vs WC		WA vs WC	
Technique Category	groups[a]	periods	gps. X per.	MA	WA	WC	t[c]	df[d]	t	df	t	df
Direct Participation	2.2	6.8**	0.1	7.5	7.8	1.4	0.6	12	2.7**	5	1.5	5
Facilitation	2.0	6.8**	1.3	3.7	4.0	4.4	0.5	12	1.9*	12	1.3	10
Observation	1.4	5.6**	1.6	1.3	1.7	1.3	1.1	11	1.9*	12	0.4	9
Restriction	0.8	0.3	0.4	1.8	3.2	1.8	0.2	10	1.6	12	0.8	8

[a] The groups are Middle-class As, Working-class As, and Working-class Cs.

[b] Standard deviation of the averages calculated for each S over two observation periods.

[c] Means of individual S's averages over two observation periods are compared.

[d] Degrees of freedom change to adjust for heterogeneity of variance.
$*p < .10$, $**p < .05$, $***p < .01$. The p values are for two-tailed t-tests.

Table IV-11 Two-Year-Old Starters: Comparison of As and Cs on Specific Techniques Used by Others in Interacting with Them

MEANS

Technique[b]	Middle Class A[a] n=8 Observation Period 24-27	(months) 30-33	$\bar{X}$ of 2 Periods	Working Class A n=6 Observation Period 24-27	(months) 30-33	$\bar{X}$ of 2 Periods	Working Class C n=6 Observation Period 24-27	(months) 30-33	$\bar{X}$ of 2 Periods
Direct Participation									
Teaching-unspecific	0.1[c]	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Didactic Teaching	2.9	4.1	3.5	1.5	6.6	4.0	1.1	1.8	1.4
Justification	0.1	0.1	0.1	0.3	0.8	0.5	0.2	0.3	0.3
Active Participation	8.7	7.4	8.1	5.1	5.7	5.4	4.5	6.6	5.6
Information Giving	2.9	4.9	3.9	3.0	2.8	2.9	1.6	1.6	1.6
Involvement-unspec.	0.8	1.4	1.1	2.4	0.3	1.3	0.1	0.0	0.0
Total-Direct Participation	15.5	18.1	16.8	12.4	16.1	14.2	7.4	10.5	8.9
Restriction									
Restriction-unspec.	1.2	0.6	0.9	0.7	2.1	1.4	1.4	0.6	1.0
Prohibition	1.7	1.9	1.8	2.8	1.9	2.3	2.1	2.0	2.1
Negative Reinforcement	0.9	1.1	1.0	1.2	1.1	1.2	2.2	2.8	2.5
Distraction, Ignoring	1.1	1.7	1.4	0.8	0.5	0.7	1.3	1.0	1.2
Refusing to Help	0.4	0.2	0.3	0.4	0.1	0.3	0.6	0.2	0.4
Total-Restriction	5.4	5.5	5.4	5.9	5.8	5.8	7.6	6.6	7.1

[a] Middle-class children are from Hollingshead-Redlich Classes I and II.
Working-class children are from Hollingshead-Redlich Classes III, IV, and V.

[b] Coding criteria for categories are described in the manual in the Appendix.

[c] For each Subject the amount of time during which the interactor used the specified technique is summed over the five observations of a three-month period and converted to a percentage of total observation time for that period (usually 9000 seconds). Each entry is an average of percentages for individual Ss.

Table IV-11 (cont.) Two-Year-Old Starters: Comparison of As and Cs on Specific Techniques Used by Others in Interacting with Them

MEANS

Technique[b]	Middle Class A[a] n=8 Observation Period			Working Class A n=6 Observation Period			Working Class C n=6 Observation Period		
	24-27	(months) 30-33	$\bar{X}$ of 2 Periods	24-27	(months) 30-33	$\bar{X}$ of 2 Periods	24-27	(months) 30-33	$\bar{X}$ of 2 Periods
Facilitation (Present)									
Providing Materials	2.2[c]	0.9	1.6	2.5	1.9	2.2	1.8	0.6	1.2
Changing Location	2.2	0.9	1.6	1.1	0.6	0.9	0.7	1.0	0.9
Providing Service	6.4	4.0	5.2	7.3	2.7	5.0	3.6	3.1	3.3
Positive Reinforcement	1.8	2.7	2.2	2.2	2.2	2.2	2.9	1.7	2.3
Total-Facil. (Present)	12.6	8.5	10.6	13.2	7.7	10.4	9.1	6.5	7.8
Facilitation (Future)									
Directive-unspecific	0.3	0.8	0.5	0.1	0.1	0.1	0.0	0.2	0.1
Suggestion, Command	3.2	4.5	3.9	4.0	3.3	3.6	2.4	3.2	2.8
Focusing on a Task	0.1	0.6	0.4	0.3	0.1	0.2	0.3	0.1	0.2
Total-Facil. (Future)	3.7	5.9	4.8	4.4	3.5	3.9	2.7	3.5	3.1
Total-Facil. (All)	16.4	14.4	15.4	17.5	11.2	14.3	11.8	10.0	10.9
Observation									
Observing	4.6	4.7	4.7	5.6	2.7	4.2	4.2	3.4	3.8
Interpreting-unspec.	1.0	0.6	0.8	0.5	0.1	0.3	0.5	0.0	0.3
Total-Observation	5.6	5.3	5.5	6.2	2.8	4.5	4.7	3.4	4.1

[a] Middle-class children are from Hollingshead-Redlich Classes I and II.
Working-class children are from Hollingshead-Redlich Classes III, IV, and V.

[b] Coding criteria for categories are described in the manual in the Appendix.

[c] For each Subject the amount of time during which the interactor used the specified technique is summed over the five observations of a three-month period and converted to a percentage of total observation time for that period (usually 9000 seconds). Each entry is an average of percentages for individual Ss.

Table IV-12 Two-Year-Old Starters: Comparison of As and Cs on Specific Techniques Used by Others in Interacting with Them

STANDARD DEVIATIONS AND RESULTS OF F AND T-TESTS

Technique	F groups[a]	F periods	F gps.X per.	Standard Deviations[b]			MA vs WA		MA vs WC		WA vs WC	
				MA	WA	WC	t[c]	df[d]	t	df	t	df
Direct Participation												
Teaching-unspecific	0.9	0.2	0.3	0.1	0.0	0.0	1.4	5	0.8	8	1.0	5
Didactic Teaching	2.2	6.3**	2.1	2.2	3.0	0.6	0.3	11	2.4*	6	1.9	5
Justification	3.7**	2.8	1.0	0.1	0.4	0.3	2.4**	8	1.1	8	1.3	9
Active Participation	0.9	0.3	1.6	5.1	3.0	1.8	1.1	9	1.2	7	0.1	8
Information Giving	4.0**	1.2	1.6	1.7	1.4	0.6	1.0	11	3.3**	6	2.0*	7
Involvement-unspec.	1.0	0.5	1.3	1.0	2.8	0.0	0.2	8	2.9**	5	1.0	5
Total-Direct Participation	2.2	6.8**	0.1	7.5	7.8	1.4	0.6	12	2.7**	5	1.5	5
Restriction												
Restriction-unspec.	0.8	0.0	3.1*	0.5	1.0	0.5	1.0	9	0.2	12	0.8	7
Prohibition	0.2	1.3	1.7	0.8	2.2	0.3	0.5	8	0.8	7	0.3	5
Negative Reinforcement	8.3***	0.5	0.4	0.5	0.9	0.7	0.4	10	4.4***	11	2.7**	9
Distraction, Ignoring	1.2	0.0	1.8	1.0	0.4	0.8	1.8	7	0.5	12	1.2	7
Refusing to Help	0.2	7.0**	0.6	0.2	0.4	0.3	0.3	10	0.4	10	0.5	10
Total-Restriction	0.8	0.3	0.4	1.8	3.2	1.8	0.2	10	1.6	12	0.8	8

[a] The groups are Middle-class As, Working-class As, and Working-class Cs.

[b] Standard deviation of the averages calculated for each S over two observation periods.

[c] Means of individual Ss averages over two observation periods are compared.

[d] Degrees of freedom change to adjust for heterogeneity of variance.
*$p < .10$, **$p < .05$, ***$p < .01$. The p values are for two-tailed tests.

Table IV-12 Two-Year-Old Starters: Comparison of As and Cs on Specific Techniques Used by Others in Interacting with Them

STANDARD DEVIATIONS AND RESULTS OF F AND T-TESTS

				Standard Deviations[b]			MA vs WA		MA vs WC		WA vs WC	
Technique	F groups[a]	F periods	F gps.X per.	MA	WA	WC	t[c]	df[d]	t	df	t	df
Facilitation (Present)												
Providing Materials	3.2*	10.8***	0.5	0.4	1.1	0.4	1.3	8	1.6	12	1.9*	6
Changing Location	1.6	1.4	1.5	1.1	0.3	0.3	1.6	6	1.6	6	0.0	10
Providing Service	1.0	9.2***	2.0	2.4	3.2	1.3	0.1	11	1.7	9	1.1	7
Positive Reinforcement	0.0	0.1	1.5	1.6	1.1	2.7	0.1	11	0.1	10	0.1	7
Total-Facil. (Present)	1.0	19.0***	0.7	3.0	4.1	4.0	0.1	11	1.3	11	1.0	10
Facilitation (Future)												
Directive-unspec.	6.5***	2.2	0.6	0.3	0.1	0.1	3.2**	6	3.1**	7	0.0	9
Suggestion, Command	0.9	0.5	0.8	1.6	1.6	0.6	0.3	12	1.6	7	1.1	7
Focusing on a Task	0.6	0.0	1.8	0.4	0.2	0.3	1.0	7	0.9	11	0.0	8
Total-Facil. (Future)	1.6	0.9	1.4	2.0	1.7	0.7	0.8	12	2.1*	7	1.0	7
Total Facilitation (All)	2.0	6.8**	1.3	3.7	4.0	4.4	0.5	12	1.9*	12	1.3	10
Observation												
Observing	0.4	4.9**	2.7*	1.8	1.6	0.9	0.6	12	1.1	8	0.4	8
Interpreting-unspec.	1.2	2.8	0.0	0.9	0.3	0.6	1.4	6	1.3	10	0.3	7
Total-Observation	1.4	5.6**	1.6	1.3	1.7	1.3	1.1	11	1.9*	12	0.4	9

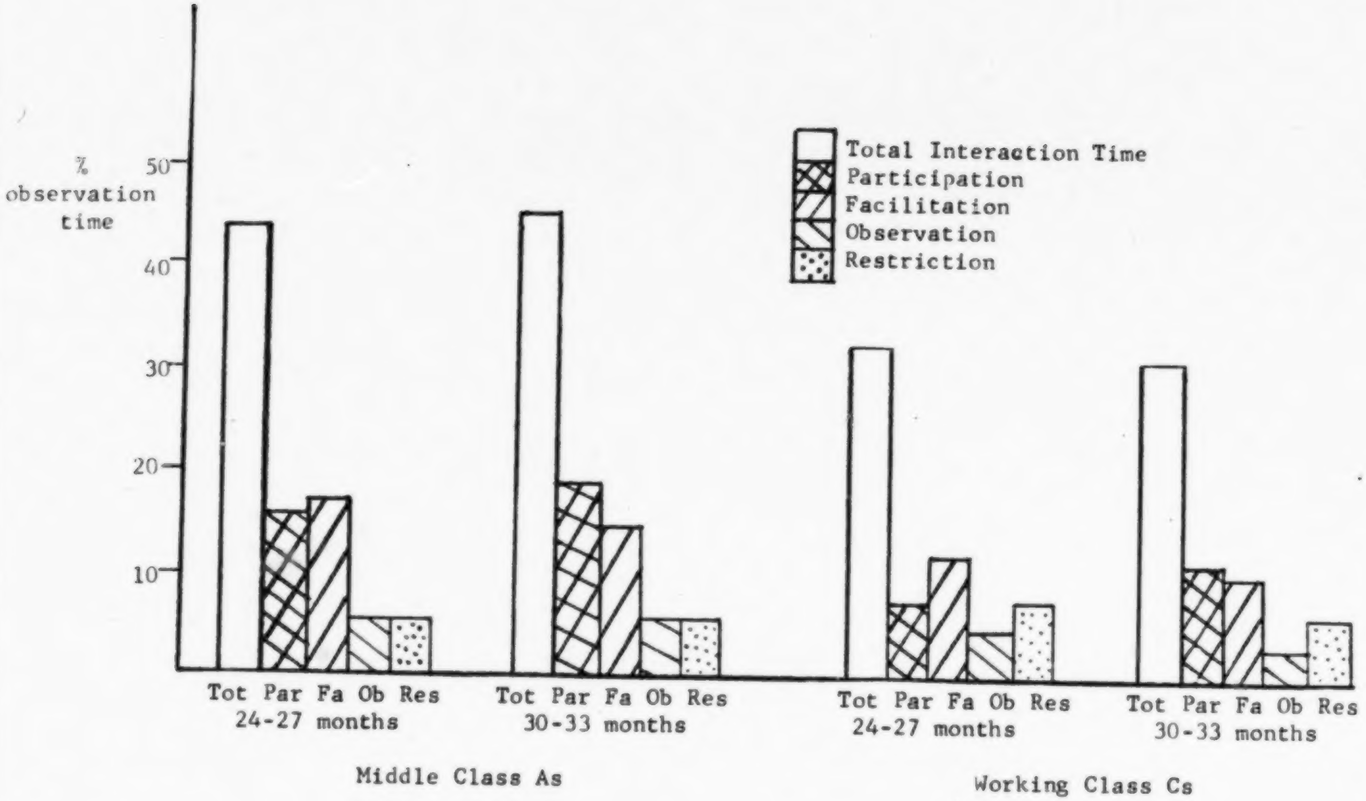
[a] The groups are Middle-class As, Working-class As, and Working-class Cs.

[b] Standard deviation of the averages calculated for each S over two observation periods.

[c] Means of individual S's averages over two observation periods are compared.

[d] Degrees of freedom change to adjust for heterogeneity of variance.
*p < .10, **p <.05, ***p < .01. The p values are for two-tailed t-tests.

Figure IV-2



Two-Year-Old Starters: Comparison of Middle-Class As and Working-Class Cs on the Style of Interaction Used by Others

7.4% of time joining in his activities as a peer. In contrast, when the working-class C child is at the same age, other people spend only 3.8% of time in teaching, justifying or conversing, and considerably more time (6.6%) merely joining in his activities.

Our second hypothesis concerned the amount of time interactors would spend participating in the child's "highly intellectual activities." We hypothesized that interactors with the A child would spend significantly more time actively involved in intellectually promising pursuits with him. This hypothesis is strongly supported by the comparison of middle-class A and working-class C children. When the middle-class A child is 30-33 months old other people spend 9.4% of observation time actively participating in intellectually valuable activities with him and almost no time at all (.02%) participating in social activities of the roughhousing and social game variety (see Table IV-13 and Figure IV-3). In dramatic contrast, when the working-class C child is 30-33 months, other people spend 2.9% of observation time actively involved in intellectually promising interactions with him and not much less time (1.9%) in roughhousing and social games. Clearly, so far as his intellectual development is concerned, interactors with the middle-class As are much more selective about the type of activities that they choose to actively participate in than are interactors with the working-class C child.

The only major category of technique which shows little difference between middle-class As and working-class Cs is that of restriction. Although interactors with the working-class Cs are generally more restrictive than interactors with the middle-class As, neither group shows much change in the use of restrictive techniques as the child moves through his third year of life, (averaging over the two observation periods, middle-class As versus

Table IV-13 Two-Year-Old Starters: Comparison of As and Cs on the Intellectual and Social Value of Interactions Which are Actively Participated in and Encouraged by Others

MEANS

Quality of Interaction x Type of Interaction[b]	Middle Class A[a] n=8 Observation Period			Working Class A n=6 Observation Period			Working Class C n=6 Observation Period		
	24-27	(months) 30-33	$\bar{X}$ of 2 Periods	24-27	(months) 30-33	$\bar{X}$ of 2 Periods	24-27	(months) 30-33	$\bar{X}$ of 2 Periods
High Intellectual									
x Participation	4.9[c]	9.4	7.1	4.7	9.7	7.2	0.8	2.9	1.8
x Encouragement	6.3	12.9	9.6	6.7	14.1	10.4	2.1	5.1	3.6
Moderate Intellectual (Play)									
x Participation	5.0	3.0	4.0	2.3	2.7	2.5	1.9	1.7	1.8
x Encouragement	6.8	5.0	5.9	5.6	4.1	4.9	3.2	2.6	2.9
Positive Social									
x Participation	0.0	0.0	0.0	0.1	0.6	0.4	0.0	1.9	1.0
x Encouragement	0.1	0.4	0.3	0.2	1.1	0.7	0.3	3.2	1.7

[a] Middle-class children are from Hollingshead-Redlich Classes I and II.
Working-class children are from Hollingshead-Redlich Classes III, IV, and V.

[b] For each Subject the amount of time during which the interactor used the specified technique in an interaction of given value for the child is summed over the five observations of a three-month period and converted to a percentage of total observation time for that period (usually 9000 seconds). Each entry is an average of individual percentages.

Table IV-14 Two-Year-Old Starters: Comparison of As and Cs on the Intellectual and Social Value of Interactions that are Actively Participated in and Encouraged by Others

STANDARD DEVIATIONS AND RESULTS OF F AND T-TESTS

Quality of Interaction x Type of Interaction	F groups[a]	F periods	F gps. X per.	Standard Deviations[b]			MA vs WA		MA vs WC		WA vs WC	
				MA	WA	WC	t[c]	df[d]	t	df	t	df
High Intellectual												
x Participation	2.9*	20.2***	1.1	4.4	5.8	0.8	0.0	11	3.1**	5	2.0**	5
x Encouragement	2.8*	14.5***	1.0	5.2	7.5	1.0	0.2	11	3.0**	6	2.0**	5
Moderate Intellectual (Play)												
x Participation	1.7	0.4	0.6	2.8	1.5	0.7	1.2	9	2.0*	6	0.9	7
x Encouragement	5.3**	2.7	0.2	1.6	2.1	0.7	1.0	11	4.5***	8	2.0**	6
Positive Social												
x Participation	1.9	4.3*	2.2	0.1	0.4	1.4	1.7	7	1.5	7	0.9	6
x Encouragement	1.4	4.1*	1.2	0.3	0.7	2.7	1.2	8	1.2	7	0.8	6

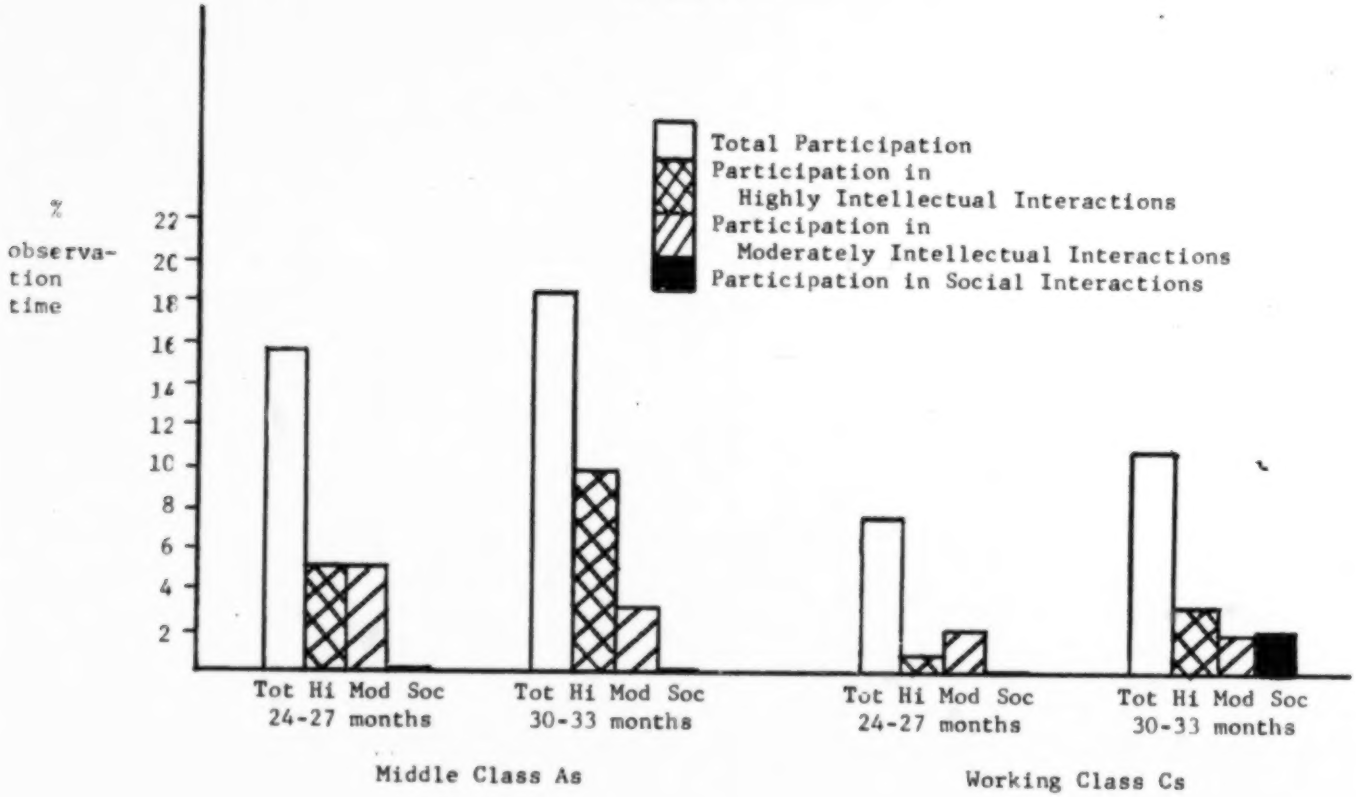
[a] The groups are Middle-class As, Working-class As, and Working-class Cs.

[b] Standard deviation of the averages calculated for each S over two observation periods.

[c] Means of individual S's averages over two observation periods are compared.

[d] Degrees of freedom change to adjust for heterogeneity of variance.
*p < .10, **p < .05, ***p < .01. The p values are for two-tailed t-tests except for comparisons of As and Cs on interactions of high intellectual value, where the t-tests are one-tailed.

Figure IV-3



Two-Year-Old Starters: Comparison of Middle-Class As and Working-Class Cs on the Quality of Interactions Which Were Actively Participated in by Others working-class Cs; 5.4 versus 7.1; $t = 1.60$; $p < .15$. See Table IV-9,10 op. cit.) This contradicts a finding which has been frequently reported by other researchers.

Attitude to the Child: Encouragement. Our third hypothesis concerns the interactor's attitude of encouragement or approval of the child's activities. Encouragement is a broader concept than participation. Although participation usually implies encouragement, activities may be encouraged without being participated in. We hypothesized that people who interact with A children would spend more time selectively encouraging activities of high intellectual value than interactors with Cs. Tables IV-15,16 provide the means and test results for encouragement in general and Tables IV-13,14 supply similar data for its selective use with respect to activities that differ in intellectual and social value.

Tables IV-15,16 show that the comparison of middle-class As and working-class Cs on the use of encouragement yield results very similar to the results for "participation." First, interactors with middle-class As spend much more time than interactors with working-class Cs generally encouraging these children's activities (MA versus WC; 29.3 versus 18.6; $t = 2.6$, $p < .05$). Second, people who interact with middle-class As spend more time selectively encouraging their "highly intellectual" activities than do interactors with working-class Cs (MA versus WC; 9.6% versus 3.6%; $t = 3.0$; $p < .05$ one tail). At 24-27 months interactors with the middle-class As spend three times as much time as interactors with the working-class Cs encouraging the child's intellectually valuable activities (6.3% versus 2.1%) and six months later, the ratio is still well over 2:1 in favor of the As (12.9% versus 5.1%).

We have focused so far on the rather invidious comparisons of middle-class As to working-class Cs. The differences in the experiences of these

Table IV-15 Two-Year-Old Starters: Comparison of As and Cs on the General Attitude of Others in Interacting with Them

MEANS

Attitude	Middle Class A[a] n=8 Observation Period			Working Class A n=6 Observation Period			Working Class C n=6 Observation Period		
	24-27	(months) 30-33	$\bar{X}$ of 2 Periods	24-27	(months) 30-33	$\bar{X}$ of 2 Periods	24-27	(months) 30-33	$\bar{X}$ of 2 Periods
Encouragement	28.2[b]	30.5	29.3	28.4	27.0	27.7	18.2	18.9	18.6
Discouragement	7.0	5.6	6.3	7.0	5.8	6.4	8.7	7.3	8.0
Neutral	7.8	8.0	7.9	6.6	3.4	5.0	4.8	4.5	4.6

[a] Middle-class children are from Hollingshead-Redlich Classes I and II.
Working-class children are from Hollingshead-Redlich Classes III, IV, and V.

[b] For each Subject the amount of time during which the interactor encouraged, discouraged, or was neutral towards him is summed over the five observations of a three-month period and converted to a percentage of total observation time (9000 seconds). Each entry is an average of individual percentages.

Table IV-16 Two-Year-Old Starters: Comparison of As and Cs on the General Attitude of Others in Interacting with Them

STANDARD DEVIATIONS AND RESULTS OF F AND T-TESTS

Attitude	F groups[a]	F periods	F gps. X per.	Standard Deviations[b] MA	WA	WC	MA vs WA t^c	df^d	MA vs WC t	df	WA vs WC t	df
Encouragement	2.4	0.1	0.4	7.9	11.6	6.2	0.3	11	2.6**	11	1.5	8
Discouragement	0.5	5.6*	0.0	1.8	4.6	2.4	0.0	8	1.3	11	0.7	8
Neutral	2.6	0.9	0.9	3.7	1.7	1.3	1.8	8	2.1*	7	0.4	8

[a] The groups are Middle-class As, Working-class As, and Working-class Cs.

[b] Standard deviation of the averages calculated for each S over two observation periods.

[c] Means of individual Ss' averages over two observation periods are compared.

[d] Degrees of freedom change to adjust for heterogeneity.
*$p < .10$, **$p < .05$, ***$p < .01$. The p values are for two-tailed tests.

children that we have reported are truly impressive but now the question arises: do the differences in experiences that we have emphasized merely reflect dissimilarities in childrearing practices of middle and working classes or do they represent differences in the experiences of A and C children regardless of class which may be critical to their development of competence?

Fortunately, we can answer this question by undertaking analyses that control for differences in socio-economic status among our comparison groups. We can do this in two ways. First we can compare working-class As and working-class C children -- that is children whose background is fairly similar but who differ strikingly in intellectual competence. Second, we can control for social class differences in quantity of interaction time by converting the raw data to percentages of interaction time rather than to percentages of observation time as was done in the main analysis. Differences between middle-class and working-class children in quantity of interaction with other people is a significant factor that may pervade all other differences. We shall find that these two solutions provide consistent, simple, and eloquent results. Let us examine each in turn.

Working-class As versus Working-class Cs

We shall start by refreshing the reader's memory concerning the relative intellectual competence of the working-class As and Cs in our sample. Table II-4 of Chapter II showed that, generally speaking, the intellectual competence of the working-class As among the two-year-old starters was quite comparable to that of the middle-class As and much superior to that of the working-class Cs. For example on the final test of mental development, the Stanford Binet test given at 36 months, the average IQ of the working-class As was 124.7 while the IQ of the working-class Cs was 95.5 -- a difference of nearly two standard deviations. Moreover, the IQs of all the children in the working-class A group save one were over 115, while the IQs of all the working-class Cs save one were less than 100.[7] We are therefore justified in thinking of the intellectual competence of these two working-class groups as highly contrasting. Can the same be said for their experiences and environments?

Table IV-5 provides the pertinent data. The results are stark and simple. Working-class A children differ significantly from working-class C children precisely and exclusively in the intellectually highly valuable interactions that we have hypothesized. They do not diverge significantly on other items that distinguished the middle-class As from the working-class Cs. To put it another way, people who interact with working-class As are even more selective in the use of their time than those who interact with middle-class As. They spend rather less time than middle-class As interacting with their children, yet the amount of time they devote to intellectually profitable interactions is equally high and much greater than that spent by interactors with working-class Cs. Let us examine these points in detail.

Quantity of Interaction. Tables IV-5,6* show that working-class As spend somewhat more time than working-class Cs interacting with other people (averaging the two observation periods the means are 39% and 31%; $t = 1.43$; $p < .25$). But in contrast to the findings for the middle-class As versus the working-class Cs, the difference between the two working-class groups is large initially (42% versus 32%, at 24-27 months) but decreases substantially over time, so that at 30-33 months it is no longer significant (36% versus 31%). This result supports our argument that people who interact with the working-class As have roughly the same amount of time at their disposal as interactors

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*These tables are duplicated here for the reader's convenience.

Table IV-5 Two-Year-Old Starters: Comparison of As and Cs on the Intellectual and Social Value of their Interactions with Others

Means

	Middle-Class A[a] n=8 Observation Period			Working-Class A n=6 Observation Period			Working-Class C n=6 Observation Period		
Value of Interaction[b]	24-27	(months) 30-33	$\bar{X}$ of 2 Periods	24-27	(months) 30-33	$\bar{X}$ of 2 Periods	24-27	(months) 30-33	$\bar{X}$ of 2 Periods
Intellectual Value									
High	6.8[c]	14.8	10.8	7.9	15.6	11.7	2.4	6.2	4.3
Moderate (converse)	5.7	4.9	5.3	5.0	3.1	4.1	6.7	4.4	5.5
Moderate (play)	12.2	8.1	10.2	10.1	7.5	8.8	7.4	5.7	6.5
Low (basic care)	11.0	8.6	9.8	9.7	5.3	7.5	9.5	6.0	7.7
Low (gross motor)	4.0	2.8	3.4	5.8	0.8	3.3	2.5	1.2	1.8
Low (unspecific)	0.2	0.2	0.2	0.7	0.2	0.4	0.3	0.8	0.6
Social Value									
Positive	0.1	0.5	0.3	0.3	1.2	0.8	0.3	3.4	1.8
Neutral	0.0	1.0	0.5	0.4	0.3	0.3	0.2	0.5	0.4
Negative	2.3	2.9	2.6	2.0	1.8	1.9	2.1	2.3	2.2
Total Interaction	43.0	44.1	43.6	42.1	36.2	39.1	31.7	30.7	31.2

[a] Middle-class children are from Hollingshead-Redlich Classes I and II.
Working-class children are from Hollingshead-Redlich Classes III, IV, and V.

[b] Evaluative criteria are described in the manual in the Appendix.

[c] The amount of time spent by each Subject in interactions of specified value is summed over the five observations of a three-month period then converted to a percentage of total observation time for that period (usually 9000 seconds). Each entry is an average of percentages for individual S's.

Table IV-6 Two-Year-Old Starters: Comparison of As and Cs on the Intellectual and Social Value of their Interactions with Others

STANDARD DEVIATIONS AND RESULTS OF F AND T-TESTS

Value of Interaction	F groups[a]	F periods	F gps. $\bar{X}$ per.	Standard Deviations[b]			MA vs WA		MA vs WC		WA vs WC	
				MA	WA	WC	t[c]	df[d]	t	df	t	df
Intellectual Value												
High	2.8*	16.0***	0.7	5.6	8.1	1.0	0.2	11	3.0**	5	2.0**	5
Moderate (converse)	0.4	4.2*	0.3	3.2	2.7	3.1	0.7	12	0.1	12	0.8	10
Moderate (play)	2.0	3.2*	0.2	2.3	4.8	0.7	0.6	9	3.9***	6	1.1	5
Low (basic care)	1.5	10.5***	0.3	3.0	1.2	2.5	1.8	7	1.3	12	0.2	7
Low (gross motor)	0.4	3.2*	0.8	2.7	4.4	1.6	0.0	10	1.2	10	0.7	6
Low (unspecific)	1.2	0.0	1.2	0.2	0.6	0.4	0.8	9	1.9*	10	0.4	9
Social Value												
Positive	1.4	4.4*	1.4	0.2	0.8	2.7	1.3	8	1.2	7	0.8	6
Neutral	0.0	0.8	0.6	1.3	0.4	0.5	0.3	6	0.2	7	0.1	9
Negative	0.4	0.2	0.2	1.9	1.1	1.1	0.9	10	0.5	9	0.4	10
Total Interaction	2.4	0.8	0.9	10.4	11.3	5.2	0.7	12	2.7**	8	1.4	7

[a] The groups are Middle-class A's, Working-class As, and Working-class Cs.

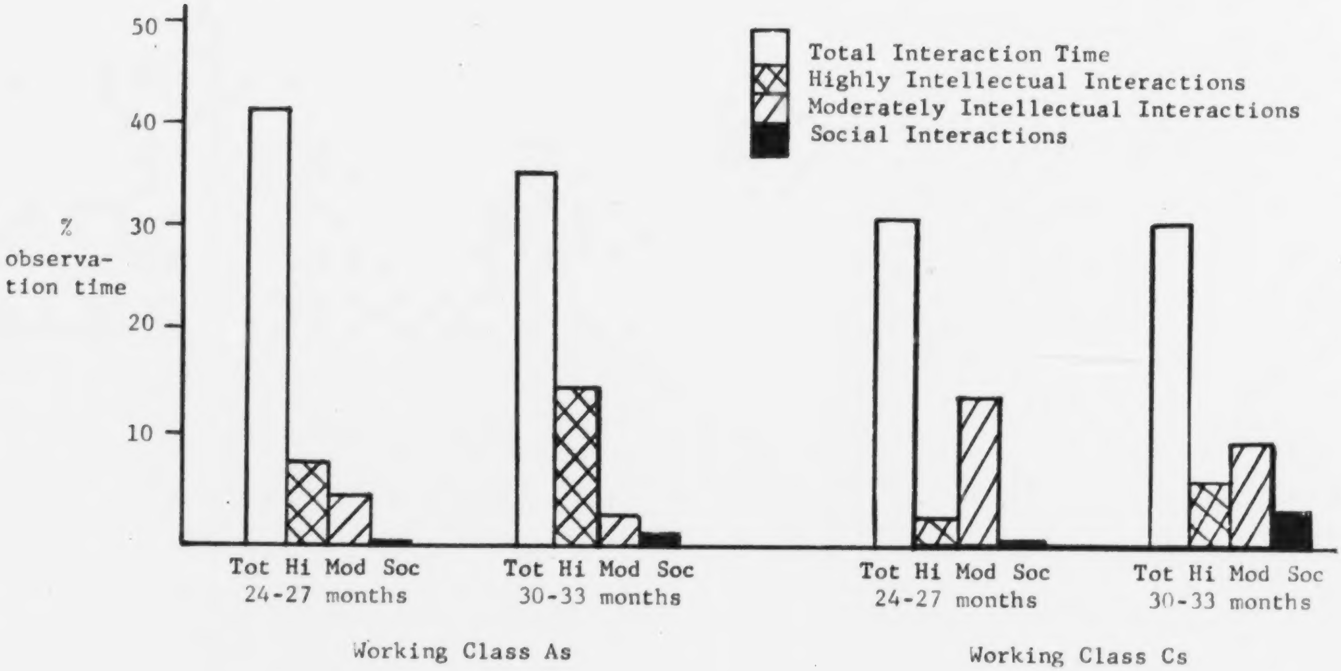
[b] Standard Deviation of the averages calculated for each S over two observation periods.

[c] Means of individual S's averages over two observation periods are compared.

[d] Degrees of freedom change to adjust for heterogeneity of variance.

*$p < .10$, **$p < .05$, ***$p < .01$. The p values are for two-tailed t-tests except for comparisons of As and Cs on interactions of high intellectual value where the t-tests are one-tailed.

Figure IV-4



Two-Year-Old Starters: Comparison of Working-Class As and Cs on the Quality of Their Interaction with Others with working-class Cs but use it more selectively to promote the children's intellectual development.

Quality of Interaction: Content and Value. We hypothesized that working-class As would spend significantly more time than working-class Cs in interactions of high intellectual value. Tables IV-5,6 and Figure IV-4 amply support this hypothesis. Averaging over the two observation periods, we find that working-class As spend 11.7% of time on "highly intellectual" activities while working-class Cs spend only 4.3% of time ($t = 2.04$, $p < .05$ one tail).[8] Equally impressive is the fact the difference between the As and Cs in intellectually valuable interactions increases over time even while the difference in total interaction time decreases. At 24-27 months the average working-class A spends 7.9% of time in intellectually challenging interactions, and by 30-33 months this figure has doubled to 15.6%. In contrast, at 24-27 months the working-class C child spends 2.4% of time on similar interactions and at 30-33 months he spends 6.2% of time -- experiencing fewer intellectually valuable interactions than the A child does at 24-27 months. To put it more vividly, at age 30-33 months the working-class A child spends over nine minutes out of an observation hour involved in interaction of high value to his intellectual development while the C child spends less than half that time.

There are other differences in the content of interactions of the working-class As and Cs which parallel the differences between middle-class As and working-class Cs that we have discussed. (For example, there are apparent differences in time spent on moderately intellectual interactions and on positive social-physical interactions.) But, interestingly, all of these differences are smaller than in the comparison of middle-class As and working-class Cs and none is statistically significant. Thus by eliminating differences that are probably attributable to social class, the comparison of the two working-class groups serves to highlight the critical connection between the young child's experiencing interactions of a certain quality with other human beings and his intellectual development. This point is dramatically emphasized again when we examine differences in style of interaction.

Style of Interaction: Techniques. We hypothesized that people who interact with the working-class A child would spend more time directly participating in and encouraging those of his activities that were of high intellectual value than would interactors with the working-class C child. We had no specific expectations as to the relative amount of time these two groups would spend participating in, facilitating, observing or restricting the children's activities in general (that is, regardless of their intellectual value). However, in the comparison of middle-class As and working-class Cs we found that general differences of this kind did distinguish the two groups. Interactors with middle-class As were more likely generally to participate in, facilitate, and carefully observe their children's activities (regardless of their intellectual value) than interactors with working-class Cs. Is this true also for the comparison of working-class As and Cs?

Tables IV-9,10 and Figure IV-5 provide the pertinent data.* Once more it seems the comparisons of the two working-class groups serves to single out those factors that truly separate the As from the Cs from those that merely distinguish middle-class from working-class children. Although people who interact with working-class As differ somewhat from those who interact with Cs in general participation, facilitation, and encouragement of the child's activities, the only differences between these groups that are statistically significant are those describing the selective use of these techniques to promote "highly

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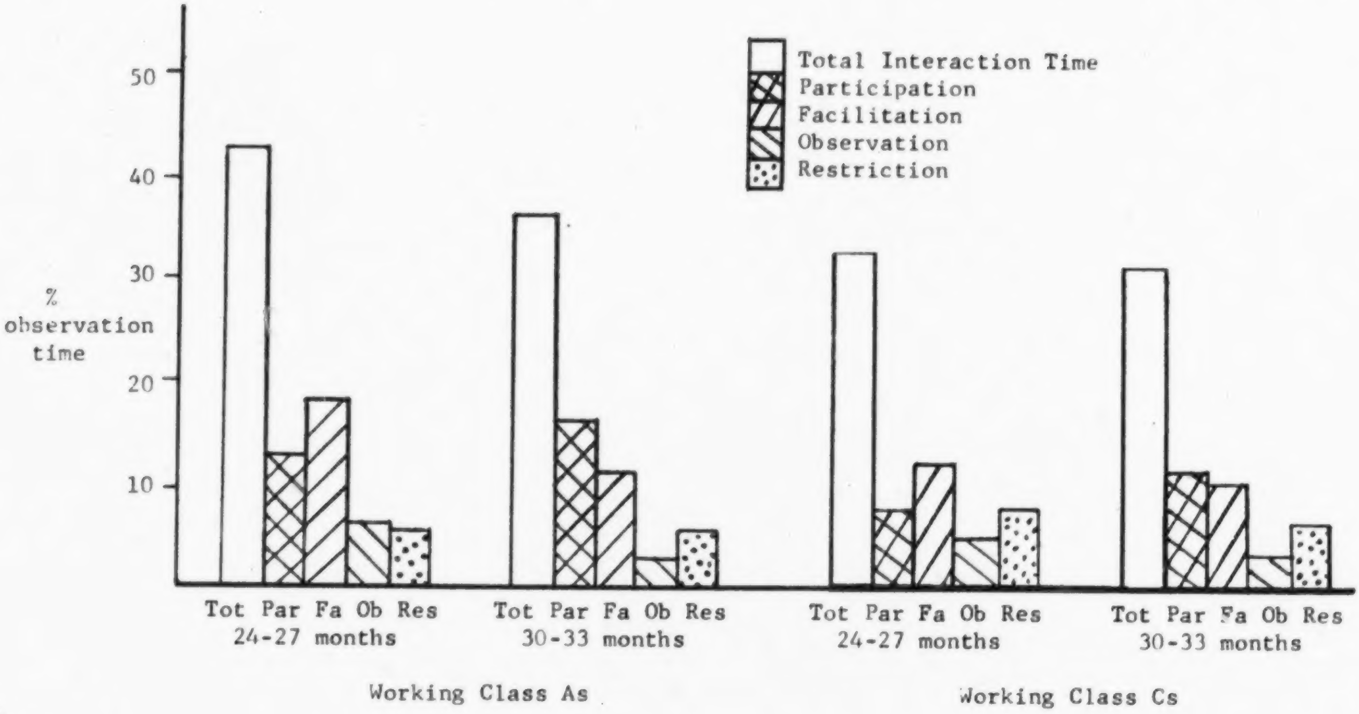
*The tables are duplicated here for the reader's convenience.

Figure IV-5



Two-Year-Old Starters: Comparison of Working-Class As and Cs on the Style of Interaction Used With Others

Table IV-9 Two-Year-Old Starters: Comparison of As and Cs on General Types of Techniques Used by Others in Interacting with Them

MEANS

	Middle Class A[a] n=8 Observation Period (months)			Working Class A n=6 Observation Period (months)			Working Class C n=6 Observation Period (months)		
Type of Technique[b]	24-27	30-33	$\bar{X}$ of 2 Periods	24-27	30-33	$\bar{X}$ of 2 Periods	24-27	30-33	$\bar{X}$ of 2 Periods
Direct Participation	15.5[c]	18.1	16.8	12.4	16.1	14.2	7.4	10.5	8.9
Facilitation	16.4	14.4	15.4	17.5	11.2	14.3	11.8	10.0	10.9
Observation	5.6	5.3	5.5	6.2	2.8	4.5	4.7	3.4	4.1
Restriction	5.4	5.5	5.4	5.9	5.8	5.8	7.6	6.6	7.1

[a] Middle-class children are from Hollingshead-Redlich Classes I and II.
Working-class children are from Hollingshead-Redlich Classes III, IV, and V.

[b] Coding criteria for categories are described in the manual in the Appendix.

[c] For each Subject the amount of time during which the interactor used techniques belonging to the specified category is summed over the five observations of a three-month period and converted to a percentage of total observation time for that period (usually 9000 seconds). Each entry is an average of individual percentages.

Table IV-10 Two-Year-Old Starters: Comparisons of As and Cs on General Types of Techniques used by Others in Interacting with Them

STANDARD DEVIATIONS AND RESULTS OF F AND T-TESTS

Technique Category	F groups[a]	F periods	F gps. X per.	Standard Deviations[b]			MA vs WA		MA vs WC		WA vs WC	
				MA	WA	WC	t[c]	df[d]	t	df	t	df
Direct Participation	2.2	6.8**	0.1	7.5	7.8	1.4	0.6	12	2.7**	5	1.5	5
Facilitation	2.0	6.8**	1.3	3.7	4.0	4.4	0.5	12	1.9*	12	1.3	10
Observation	1.4	5.6**	1.6	1.3	1.7	1.3	1.1	11	1.9*	12	0.4	9
Restriction	0.8	0.3	0.4	1.8	3.2	1.8	0.2	10	1.6	12	0.8	8

[a] The groups are Middle-class As, Working-class As, and Working-class Cs.

[b] Standard deviation of the averages calculated for each S over two observation periods.

[c] Means of individual S's averages over two observation periods are compared.

[d] Degrees of freedom change to adjust for heterogeneity of variance.
*p ∠.10, **p ∠.05, ***p ∠.01. The p values are for two-tailed t-tests.

intellectual" activities. For example, there is no significant difference between working-class As and Cs in overall participation by others in their activities (WA versus WC: 14.2% versus 8.9%; $t = 1.50$; $p < .20$). Instead, what is strikingly significant is the difference between interactors with the As and Cs in participation in activities of high intellectual value (see Tables IV-13,14 and Figure IV-6).* Averaging over the two observation periods, we find that interactors with the As spend over three times as much time as their C counterparts actively involved in highly intellectual activities (7.2% versus 1.8%; $t = 2.04$; $p < .05$, one tail) and the gap widens decisively over time. Thus at age 24-27 months people who interact with the A child spend about 5% of observation time actively participating in intellectually promising activities with these children while interactors with C children spend less than 1% of time in similar pursuits. Still more compelling, at age 30-33 months, the As spend nearly 10% of observation time on such interactions while the C group spends less than 3% of this time.

The significance of these findings is amplified by comparing time spent participating in intellectually valuable activities to time spent joining in social activities of the roughhousing and social game variety. Table IV-13 and Figure IV-6 show that when the working-class A child is 30-33 months old other people devote much more observation time (9.7%) to sharing in activities of high intellectual value as to participating in positive social activities of the roughhousing and social game variety (0.6%). These figures contrast sharply with those for the C child. When the working-class C child is 30-33 months old, other people devote only 2.9% of observation time to sharing his intellectually promising pursuits and not much less time (1.9%) to participating with him in social games and roughhousing. Clearly, the working-class A child has many more experiences that are powerfully calculated to promote his intellectual development than the working-class C child.

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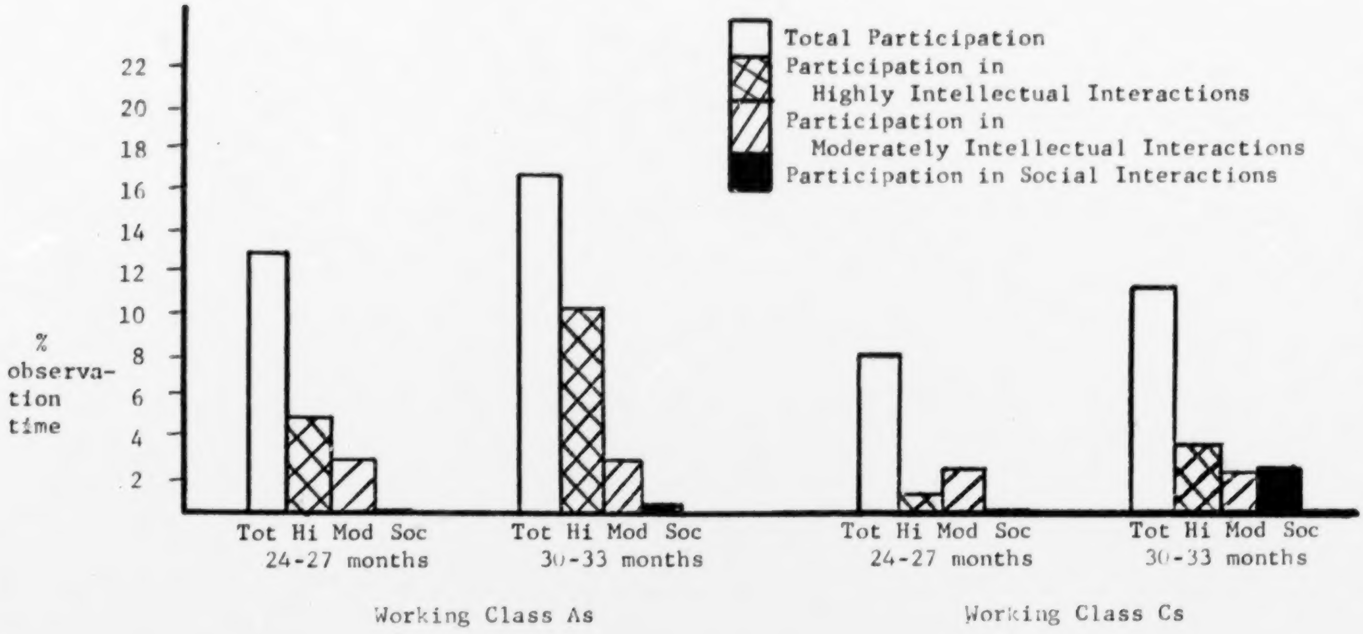
*The tables are duplicated here for the reader's convenience.

Figure IV-6



Two-Year-Old Starters: Comparison of Working-Class As and Cs on the Quality of the Interactions Which Were Actively Participated in by Others

Table IV-13 Two-Year-Old Starters: Comparison of As and Cs on the Intellectual and Social Value of Interactions Which are Actively Participated in and Encouraged by Others

MEANS

Quality of Interaction x Type of Interaction[b]	Middle Class A[a] n=8 Observation Period (months) 24-27	30-33	$\bar{X}$ of 2 Periods	Working Class A n=6 Observation Period (months) 24-27	30-33	$\bar{X}$ of 2 Periods	Working Class C n=6 Observation Period (months) 24-27	30-33	$\bar{X}$ of 2 Periods
High Intellectual									
x Participation	4.9[c]	9.4	7.1	4.7	9.7	7.2	0.8	2.9	1.8
x Encouragement	6.3	12.9	9.6	6.7	14.1	10.4	2.1	5.1	3.6
Moderate Intellectual (Play)									
x Participation	5.0	3.0	4.0	2.3	2.7	2.5	1.9	1.7	1.8
x Encouragement	6.8	5.0	5.9	5.6	4.1	4.9	3.2	2.6	2.9
Positive Social									
x Participation	0.0	0.0	0.0	0.1	0.6	0.4	0.0	1.9	1.0
x Encouragement	0.1	0.4	0.3	0.2	1.1	0.7	0.3	3.2	1.7

[a] Middle-class children are from Hollingshead-Redlich Classes I and II.
Working-class children are from Hollingshead-Redlich Classes III, IV, and V.

[b] For each Subject the amount of time during which the interactor used the specified technique in an interaction of given value for the child is summed over the five observations of a three-month period and converted to a percentage of total observation time for that period (usually 9000 seconds). Each entry is an average of individual percentages.

Table IV-14 Two-Year-Old Starters: Comparison of As and Cs on the Intellectual and Social Value of Interactions that are Actively Participated in and Encouraged by Others

STANDARD DEVIATIONS AND RESULTS OF F AND T-TESTS

Quality of Interaction x Type of Interaction	F groups[a]	F periods	F gps. X per.	Standard Deviations[b]			MA vs WA		MA vs WC		WA vs WC	
				MA	WA	WC	t[c]	df[d]	t	df	t	df
High Intellectual												
x Participation	2.9*	20.2***	1.1	4.4	5.8	0.8	0.0	11	3.1**	5	2.0**	5
x Encouragement	2.8*	14.5***	1.0	5.2	7.5	1.0	0.2	11	3.0**	6	2.0**	5
Moderate Intellectual (Play)												
x Participation	1.7	0.4	0.6	2.8	1.5	0.7	1.2	9	2.0*	6	0.9	7
x Encouragement	5.3**	2.7	0.2	1.6	2.1	0.7	1.0	11	4.5***	8	2.0**	6
Positive Social												
x Participation	1.9	4.3*	2.2	0.1	0.4	1.4	1.7	7	1.5	7	0.9	6
x Encouragement	1.4	4.1*	1.2	0.3	0.7	2.7	1.2	8	1.2	7	0.8	6

[a] The groups are Middle-class As, Working-class As, and Working-class Cs.

[b] Standard deviation of the averages calculated for each S over two observation periods.

[c] Means of individual S's averages over two observation periods are compared.

[d] Degrees of freedom change to adjust for heterogeneity of variance.
*p < .10, **p < .05, ***p < .01. The p values are for two-tailed t-tests except for comparisons of As and Cs on interactions of high intellectual value, where the t-tests are one-tailed.

Attitude to the Child: Encouragement. Finally, we turn to the data on the interactors general attitude of encouragement or approval of the child's activities. We hypothesized that people who interact with working-class As would spend more time selectively encouraging their intellectually valuable activities than their counterparts with working-class Cs. We had no special expectations regarding the interactor's use of encouragement in general, although our findings for the comparison of middle-class As and working-class Cs suggested that interactors with the first group were more likely to be generally encouraging of all of the child's activities.

Tables IV-15,16 and IV-13,14* provide the data for the comparison of the two working-class groups on the use of encouragement in general and its specific use to promote intellectually valuable activities. The outstanding features of these results are that they precisely mirror the findings for "participation" just reported. Interactors with working-class As do not differ significantly from interactors with working-class Cs in their general encouragement of the child's activities (WA versus WC; 27.7 versus 18.6, $t = 1.5$; $p < .25$) but they do diverge significantly in their specific encouragement of activities of high intellectual value (WA versus WC; 10.4% versus 3.6%, $t = 2.0$; $p < .05$ one tail). At 24-27 months the typical working-class A child spends three times as much time as the average C child on highly intellectual activities that are overtly encouraged by others (6.7% versus 2.1%) and this ratio continues unchanged at 30-33 months, while the absolute gap widens dramatically to 14.1% versus 5.1%.

It would be fair to summarize our findings for the comparison of working-class As and Cs among the two-year-old starters by saying that the role played by the human environment in the experiences of the working-class A child is extraordinarily similar to that played by the environment of the middle-class A child and quite unlike that played by the environment of the working-class C child. People who interact with both groups of A children -- their mothers, families, friends, acquaintances -- devote much more time to interactions that, in our judgment, promote the child's intellectual progress and are much more likely to take an active part in and to encourage these interactions than people who interact with the working-class C children. The human environment of A children emphasizes their intellectual development, and does so more and more selectively and intensively as the child matures.

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*These tables are duplicated here for the reader's convenience.

Another Method of Controlling for Social Class Differences

Another way to control for differences in socio-economic status is to convert the raw data (time spent on different categories of interaction) to percentages of interaction time instead of percentages of observation time. We chose to convert the data to percentages of observation time for our principal method of data analysis because we felt that the sheer quantity of experience of certain types of intellectually valuable interactions was of primary importance to the child's development. If a child spent 10% of observation time (and, by extrapolation, 10% of his waking hours) in intellectually valuable interactions we considered this was more important to his intellectual development than if he spent 1% of time on such activities, even though the first figure might be a lower percentage of his total *interaction* time with his human environment than the second.

However it can be argued that using observation time as a base for transforming the data is, in some sense, not fair to all groups in the study. For example, people from lower socio-economic groups may have less time to spend interacting with their children, but when they do, the quality of their interactions (as we have defined it) may be similar to that of middle-class children.

Table IV-13 Two-Year-Old Starters: Comparison of As and Cs on the Intellectual and Social Value of Interactions Which are Actively Participated in and Encouraged by Others

MEANS

Quality of Interaction x Type of Interaction[b]	Middle Class A[a] n=8 Observation Period 24-27	(months) 30-33	$\bar{X}$ of 2 Periods	Working Class A n=6 Observation Period 24-27	(months) 30-33	$\bar{X}$ of 2 Periods	Working Class C n=6 Observation Period 24-27	(months) 30-33	$\bar{X}$ of 2 Periods
High Intellectual									
x Participation	4.9[c]	9.4	7.1	4.7	9.7	7.2	0.8	2.9	1.8
x Encouragement	6.3	12.9	9.6	6.7	14.1	10.4	2.1	5.1	3.6
Moderate Intellectual (Play)									
x Participation	5.0	3.0	4.0	2.3	2.7	2.5	1.9	1.7	1.8
x Encouragement	6.8	5.0	5.9	5.6	4.1	4.9	3.2	2.6	2.9
Positive Social									
x Participation	0.0	0.0	0.0	0.1	0.6	0.4	0.0	1.9	1.0
x Encouragement	0.1	0.4	0.3	0.2	1.1	0.7	0.3	3.2	1.7

[a] Middle-class children are from Hollingshead-Redlich Classes I and II.
Working-class children are from Hollingshead-Redlich Classes III, IV, and V.

[b] For each Subject the amount of time during which the interactor used the specified technique in an interaction of given value for the child is summed over the five observations of a three-month period and converted to a percentage of total observation time for that period (usually 9000 seconds). Each entry is an average of individual percentages.

Table IV-14 Two-Year-Old Starters: Comparison of As and Cs on the Intellectual and Social Value of Interactions that are Actively Participated in and Encouraged by Others

STANDARD DEVIATIONS AND RESULTS OF F AND T-TESTS

Quality of Interaction x Type of Interaction	F groups[a]	F periods	F gps. X per.	Standard Deviations[b] MA	WA	WC	MA vs WA t[c]	df[d]	MA vs WC t	df	WA vs WC t	df
High Intellectual												
x Participation	2.9 *	20.2***	1.1	4.4	5.8	0.8	0.0	11	3.1**	5	2.0**	5
x Encouragement	2.8 *	14.5***	1.0	5.2	7.5	1.0	0.2	11	3.0**	6	2.0**	5
Moderate Intellectual (Play)												
x Participation	1.7	0.4	0.6	2.8	1.5	0.7	1.2	9	2.0*	6	0.9	7
x Encouragement	5.3**	2.7	0.2	1.6	2.1	0.7	1.0	11	4.5***	8	2.0**	6
Positive Social												
x Participation	1.9	4.3 *	2.2	0.1	0.4	1.4	1.7	7	1.5	7	0.9	6
x Encouragement	1.4	4.1 *	1.2	0.3	0.7	2.7	1.2	8	1.2	7	0.8	6

[a] The groups are Middle-class As, Working-class As, and Working-class Cs.

[b] Standard deviation of the averages calculated for each S over two observation periods.

[c] Means of individual S's averages over two observation periods are compared.

[d] Degrees of freedom change to adjust for heterogeneity of variance.
*p < .10, **p < .05, ***p < .01. The p values are for two-tailed t-tests except for comparisons of As and Cs on interactions of high intellectual value, where the t-tests are one-tailed.

Table IV-15 Two-Year-Old Starters: Comparison of As and Cs on the General Attitude of Others in Interacting with Them

MEANS

Attitude	Middle Class A[a] n=8 Observation Period			Working Class A n=6 Observation Period			Working Class C n=6 Observation Period		
	24-27	(months) 30-33	$\bar{X}$ of 2 Periods	24-27	(months) 30-33	$\bar{X}$ of 2 Periods	24-27	(months) 30-33	$\bar{X}$ of 2 Periods
Encouragement	28.2[b]	30.5	29.3	28.4	27.0	27.7	18.2	18.9	18.6
Discouragement	7.0	5.6	6.3	7.0	5.8	6.4	8.7	7.3	8.0
Neutral	7.8	8.0	7.9	6.6	3.4	5.0	4.8	4.5	4.6

[a] Middle-class children are from Hollingshead-Redlich Classes I and II.
Working-class children are from Hollingshead-Redlich Classes III, IV, and V.

[b] For each Subject the amount of time during which the interactor encouraged, discouraged, or was neutral towards him is summed over the five observations of a three-month period and converted to a percentage of total observation time (9000 seconds). Each entry is an average of individual percentages.

Table IV-16 Two-Year-Old Starters: Comparison of As and Cs on the General Attitude of Others in Interacting with Them

STANDARD DEVIATIONS AND RESULTS OF F AND T-TESTS

Attitude	F groups[a]	F periods	F gps. X per.	Standard Deviations[b] MA	WA	WC	MA vs WA t[c]	df[d]	MA vs WC t	df	WA vs WC t	df
Encouragement	2.4	0.1	0.4	7.9	11.6	6.2	0.3	11	2.6**	11	1.5	8
Discouragement	0.5	5.6*	0.0	1.8	4.6	2.4	0.0	8	1.3	11	0.7	8
Neutral	2.6	0.9	0.9	3.7	1.7	1.3	1.8	8	2.1*	7	0.4	9

[a] The groups are Middle-class As, Working-class As, and Working-class Cs.

[b] Standard deviation of the averages calculated for each S over two observation periods.

[c] Means of individual Ss' averages over two observation periods are compared.

[d] Degrees of freedom change to adjust for heterogeneity.
$*p < .10$, $**p < .05$, $***p < .01$. The p values are for two-tailed tests.

In any case it is important to note how the findings stand up after controlling for social class differences in this way. Are there significant changes in the results? Tables IV-17,18,19,20 and Figures IV-7,8,9, provide the relevant data for the two-year-old starters. One remarkable finding stands out. It is that although the absolute figures change substantially when the raw data is converted to percentage of interaction time, the items that now distinguish the middle-class As from the working-class Cs are exactly those that distinguished the working-class As from the working-class Cs in the main analysis. Specifically, the tables show that the means for the middle-class As and the working-class As are now very similar on almost every item and each is significantly different from that of the working-class Cs on the following variables only:

Percentage of interaction time devoted to activities of high intellectual value.

--Middle-class As versus working-class Cs: 23% versus 14%; $t = 2.5$, $p < .05$ one tail.

--Working-class As versus working-class Cs: 28% versus 14%; $t = 2.7$, $p < .05$, one tail.

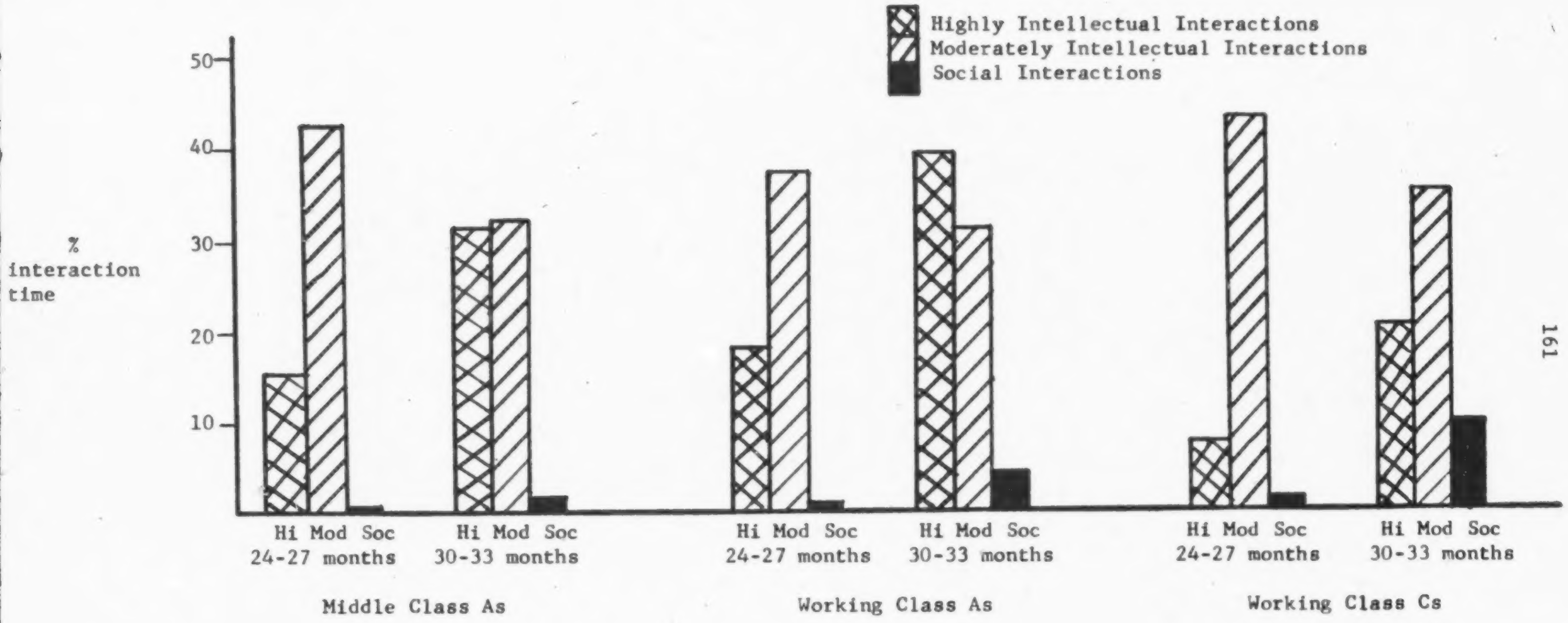
Percentage of interaction time spent directly participating in the child's intellectually valuable activities.

--Middle-class As versus working-class Cs: 14.7% vs. 6.1%; $t = 2.9$, $p < .05$ one tail.

--Working-class As versus working-class Cs: 17.5% versus 6.1%; $t = 2.7$, $p < .05$ one tail.

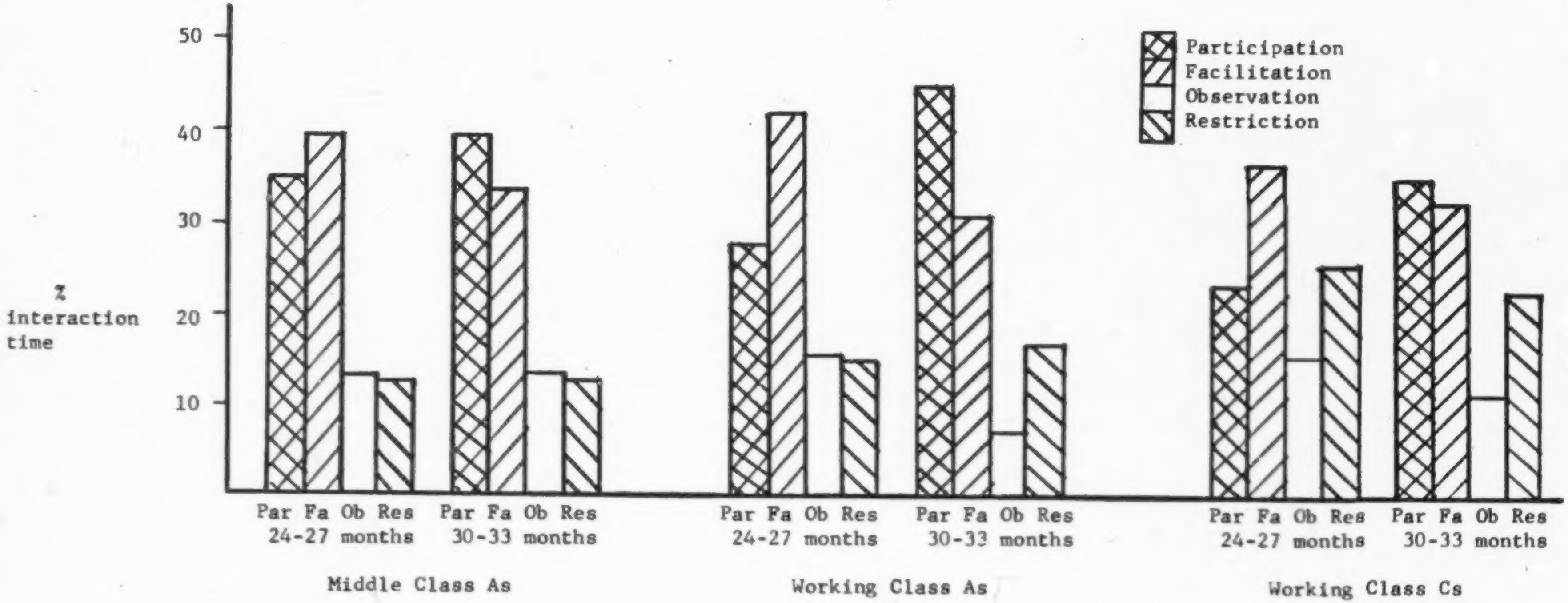
Percentage of interaction time spent encouraging the child's intellectually valuable interactions.

Figure IV-7



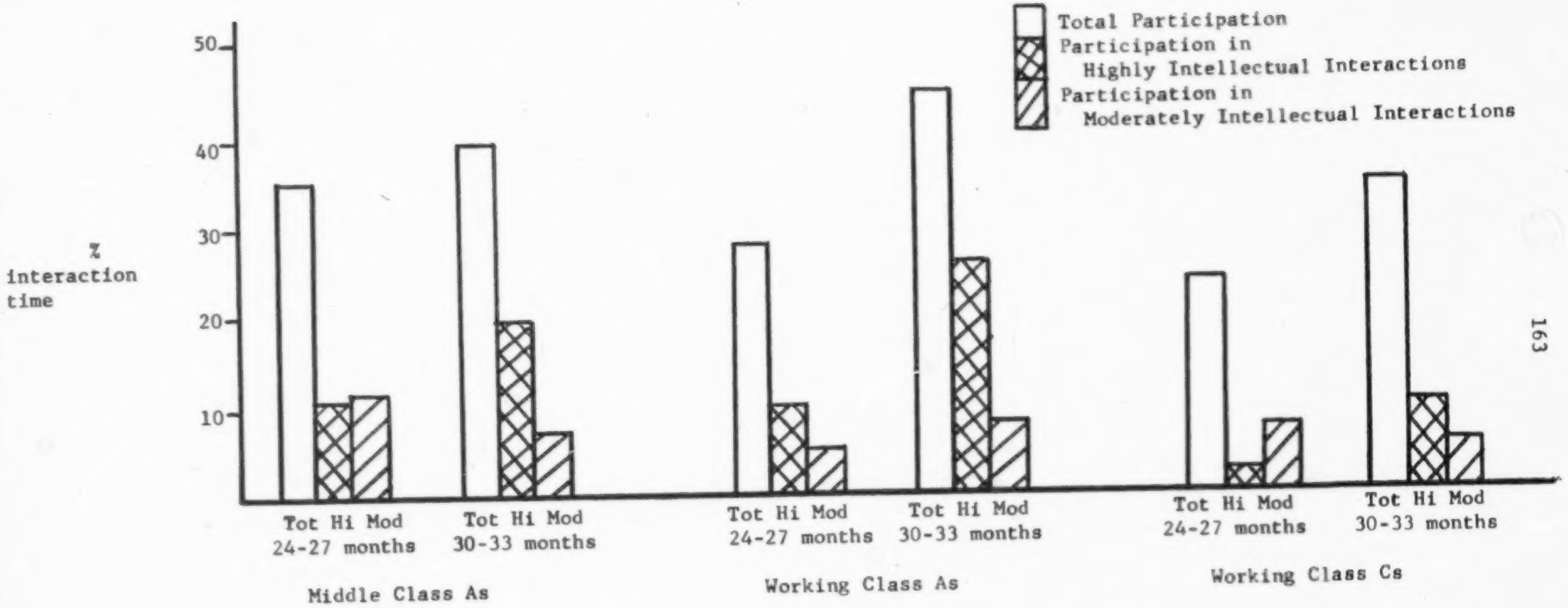
Two-Year-Old Starters: Comparison of As and Cs on the Quality of Their Interactions with Others

Figure IV-8



Two-year-old Starters: Comparison of As and Cs on the Style of Interaction Used by Others

Figure IV-9



Two-Year-Old Starters: Comparison of As and Cs on the Quality of Interactions Which Were Actively Participated in by Others

Table IV-17 Two-Year-Old Starters: Comparison of As and Cs on the Intellectual and Social Value of their Interactions with Others
(Data Base = Total interaction time)

MEANS

	Middle Class A[a] n=8 Observation Period			Working Class A n=6 Observation Period			Working Class C n=6 Observation Period		
Value of Interaction[b]	24-27	(months) 30-33	$\bar{X}$ of 2 Periods	24-27	(months) 30-33	$\bar{X}$ of 2 Periods	24-27	(months) 30-33	$\bar{X}$ of 2 Periods
Intellectual Value									
High	15.0[c]	31.1	23.0	17.6	38.9	28.2	7.7	20.5	14.1
Moderate (converse)	13.6	11.2	12.4	13.5	8.6	11.1	19.6	15.8	17.7
Moderate (play)	28.4	20.4	24.4	23.3	22.5	22.9	23.7	18.9	21.3
Low (basic care)	26.3	20.6	23.4	25.8	15.0	20.4	29.9	18.6	24.3
Low (gross motor)	8.7	6.2	7.5	10.9	2.3	6.6	7.6	4.1	5.8
Low (unspecific)	0.4	0.4	0.4	1.6	0.6	1.1	0.9	2.4	1.7
Social Value									
Positive	0.3	1.2	0.8	0.6	4.5	2.5	0.9	9.6	5.3
Neutral	0.0	2.0	1.0	0.9	1.0	1.0	0.7	1.6	1.2
Negative	5.8	6.0	5.9	5.2	5.7	5.4	8.2	7.4	7.8

[a] Middle-class children are from Hollingshead-Redlich Classes I and II.
Working-class children are from Hollingshead-Redlich Classes III, IV, and V.

[b] Evaluative criteria are described in the manual in the Appendix.

[c] The amount of time spent by each Subject in interactions of specified value is summed over the five observations of a three-month period then converted to a percentage of total observation time for that period (usually 9000 seconds). Each entry is an average of percentages for individual Ss.

Table IV-18 Two-Year-Old Starters: Comparison of As and Cs on the Intellectual and Social Value of their Interactions with Others
(Data Base = Total interaction time)

STANDARD DEVIATIONS AND RESULTS OF F AND T-TESTS

Value of Interaction	F groups[a]	F periods	F gps. X per.	Standard Deviations[b] MA	WA	WC	MA vs WA t[c]	df[d]	MA vs WC t	df	WA vs WC t	df
Intellectual Value												
High	4.3**	33.0***	0.7	7.9	10.8	4.2	0.9	11	2.5**	9	2.7**	6
Moderate (converse)	1.0	2.7	0.1	6.9	8.1	9.9	0.3	12	1.0	11	1.2	10
Moderate (play)	0.3	2.0	0.4	6.1	10.5	3.3	0.3	10	1.1	9	0.3	6
Low (basic care)	0.4	18.0***	0.7	8.0	7.2	6.3	0.7	12	0.2	11	0.9	10
Low (gross motor)	0.1	3.2*	0.5	5.2	6.8	4.6	0.3	11	0.6	12	0.2	9
Low (unspecific)	2.0	0.0	1.3	0.5	1.4	1.2	1.1	8	2.2*	9	0.7	10
Social Value												
Positive	1.5	5.6**	1.5	0.8	2.8	7.3	1.4	8	1.4	7	0.8	6
Neutral	0.0	1.3	0.4	2.6	1.1	1.8	0.0	7	0.2	11	0.2	8
Negative	0.5	0.0	0.0	4.0	3.8	4.5	0.2	12	0.8	12	0.9	10

[a] The groups are Middle-class A's, Working-class As, and Working-class Cs.

[b] Standard Deviation of the averages calculated for each S over two observation periods.

[c] Means of individual S's averages over two observation periods are compared.

[d] Degrees of freedom change to adjust for heterogeneity of variance.
*$p < .10$, **$p < .05$, ***$p < .01$. The p values are for two-tailed t-tests except for comparisons of As and Cs on interactions of high intellectual value where the t-tests are one-tailed.

Table IV-19 Two-Year-Old Starters: Comparison of As and Cs on the Intellectual Interactions Which are Actively Participated in and Encouraged by Others

(Data Base = Total interaction time)

MEANS

Quality of Interaction x Type of Interaction	Middle Class A[a] n=8 Observation Period (months) 24-27	30-33	$\bar{X}$ of 2 Periods	Working Class A n=6 Observation Period (months) 24-27	30-33	$\bar{X}$ of 2 Periods	Working Class C n=6 Observation Period (months) 24-27	30-33	$\bar{X}$ of 2 Periods
High Intellectual									
x Participation	10.7[b]	18.8	14.7	9.8	25.2	17.5	2.4	9.8	6.1
x Encouragement	14.0	26.5	20.2	14.7	35.6	25.1	6.9	17.6	12.2
Moderate Intellectual (Play)									
x Participation	11.1	6.7	8.9	4.8	7.8	6.3	6.6	5.5	6.1
x Encouragement	16.6	12.4	14.5	13.1	12.2	12.6	10.5	8.6	9.6

[a] Middle-class children are from Hollingshead-Redlich Classes I and II.
Working-class children are from Hollingshead-Redlich Classes III, IV, and V.

[b] For each Subject the amount of time during which the interactor used the specified technique in an interaction of given value for the child is summed over the five observations of a three-month period and the percentage of total interaction time is calculated on the basis of the total amount of time spent in all interactions.

Table IV-20 Two-Year-Old Starters: Comparison of As and Cs on the Intellectual Value of Interactions that are Actively Participated in and Encouraged by Others
(Data Base = Total interaction time)

STANDARD DEVIATIONS AND RESULTS OF F AND T-TESTS

				Standard Deviations[b]			MA vs WA		MA vs WC		WA vs WC	
Quality of Interaction x Type of Interaction	F groups[a]	F periods	F gps. X per.	MA	WA	WC	t[c]	df[d]	t	df	t	df
High Intellectual												
x Participation	4.3**	29.3***	1.8	7.0	8.9	2.7	0.6	11	2.9**	7	2.7**	6
x Encouragement	3.9**	33.1***	1.5	7.8	10.1	4.2	0.9	11	2.3**	9	2.6**	7
Moderate Intellectual (Play)												
x Participation	0.9	0.2	1.3	5.1	3.5	2.4	1.1	11	1.3	8	0.1	9
x Encouragement	1.8	1.4	0.3	5.4	4.3	2.7	0.7	11	2.1*	8	1.3	8

[a] The groups are Middle-class As, Working-class As, and Working-class Cs.

[b] Standard deviation of the averages calculated for each S over two observation periods.

[c] Means of individual S's averages over two observation periods are compared.

[d] Degrees of freedom change to adjust for heterogeneity of variance.
*$p < .10$, **$p < .05$, ***$p < .01$. The p values are for two-tailed t-tests except for comparisons of As and Cs on interactions of high intellectual value, where the t-tests are one-tailed.

-- Middle-class As versus working-class Cs: 20.2% versus 12.2%; $t = 2.3$; $p < 025$, one tail.

-- Working-class As versus working-class Cs: 25.1% versus 12.2%; $t = 2.6$; $p < .025$, one tail.

Of course, these are precisely the differences that we hypothesized would distinguish As from Cs and it is entirely welcome to find that other unanticipated differences between middle-class As and working-class Cs that appeared in the main analysis (where the raw data was convertdd to percentages of observation time) have now vanished. Indeed it is remarkable that all the significant differences between middle-class As and working-class Cs which were not matched by corresponding differences between working-class As and working-class Cs in the principal analysis -- that is, all significant differences which we thought merely reflected social class dissimilarities in childrearing -- have disappeared in this new treatment of the data. For example, there is no longer any hint of a difference between middle-class As and working-class Cs on the percentage of interaction time spent on moderately intellectual activities, nor a difference on the overall, unselective use of techniques of participation, facilitation, or observation, nor a difference in their general, indiscriminate encouragement of the child's activities.

Thus, the findings from this second method of controlling for social class differences strongly reinforces our conclusion that the experiences with the human environment that play a critical role in the child's intellectual development are precisely those that observers can agree *a priori* will be of most intellectual value to him. Other differences that reflect childrearing dissimilarities between social classes may affect intellectual development also, but they certainly seem to be of much less importance.

Results: One-Year-Old Starters

As we have mentioned several times before, the data for the one-year-old starters will be only briefly discussed in this report since the composition of the groups in this sample, and therefore their results are likely to change when all the one-year-old starters complete the test series and are finally classified as A or C at the age of three. Tables IV-21 through IV-26 list the means for the analysis of variance and the results for the F and t tests for variables dealing with the quantity, quality and style of the child's interaction with others. We emphasize that these results pertain to groups whose composition is highly likely to change within the lifetime of this project, hence the listed data must be considered with extreme caution.

Middle-Class As versus Working Class Cs: Quantity of Interaction

The results for the comparison of the middle-class As and working-class Cs among the one-year-old starters are very like those reported for their counterparts among the two-year-old starters. First, middle-class As experience much more interaction with other people than working-class Cs. This difference is very large even at 12-15 months (47% versus 24%), and remains substantial at 18-21 months (43% versus 31%) and 24-27 months (41% versus 31%). Averaging over the three observation periods the mean for the middle-class As is 44% while the mean for the working-class Cs is 28% -- a compelling difference when extrapolated to the child's entire waking day ($t = 2.93$; $p < .05$). See Tables IV-21,22.

Quality of Interaction: Value and Content

As was the case for the two-year-old starters, Tables IV-23,24 show striking differences in the quality of interaction experienced by middle-class As and working-class Cs. Averaging over three periods, we find that the middle-class

Table IV-21 One-Year-Old Starters: Comparison of As and Cs on the Intellectual and Social Value of their Interactions with Others

MEANS

Value of Interaction[b]	Middle Class A[a] n=8 Observation Period (months) 12-15	18-21	24-27	$\bar{X}$ of 3 Periods	Working Class A n=6 Observation Period (months) 12-15	18-21	24-27	$\bar{X}$ of 3 Periods	Working Class C n=6 Observation Period (months) 12-15	18-21	24-27	$\bar{X}$ of 3 Periods
Intellectual Value												
High	9.3[c]	13.3	15.4	12.6	6.0	6.5	6.8	6.4	1.7	5.8	6.6	4.7
Moderate (converse)	5.1	3.7	3.0	3.9	5.3	3.7	2.7	3.9	0.6	0.6	1.0	0.7
Moderate (play)	14.1	11.6	7.3	10.9	15.7	9.7	6.0	10.5	8.6	7.8	5.3	7.2
Low (basic care)	11.6	9.2	8.1	9.6	9.7	9.7	5.4	8.3	5.4	5.0	6.2	5.6
Low (gross motor)	3.3	3.2	1.6	2.6	1.4	1.2	6.7	3.1	1.2	3.2	0.2	1.5
Low (unspecific)	0.3	0.2	0.6	0.3	0.8	0.7	1.1	0.9	1.4	0.9	0.2	0.8
Social Value												
Positive	0.0	0.3	1.8	0.7	1.1	1.3	1.9	1.4	2.7	4.9	7.9	5.2
Neutral	0.0	0.0	1.1	0.4	0.6	1.2	1.0	0.9	0.9	0.9	1.1	1.0
Negative	3.0	1.4	1.9	2.1	2.2	1.7	1.4	1.8	1.2	1.6	2.1	1.6
Total Interaction	47.1	43.2	40.6	43.6	43.2	36.1	33.0	37.4	23.9	30.6	30.5	28.3

[a] Middle-class children are from Hollingshead-Redlich Classes I and II.
Working-class children are from Hollingshead-Redlich Classes III, IV and V.

[b] Evaluative criteria are described in the **manual in the Appendix.**

[c] The amount of time spent by each S in interactions of specified value is summed over the five observations of a three-month period then converted to a percentage of total observation time for that period (usually, 9000 seconds). Each entry is an average of percentages for individual Ss.

Table IV-22 One-Year-Old Starters: Comparison of As and Cs on the Intellectual and Social Value of their Interactions with Others

STANDARD DEVIATIONS AND RESULTS OF F AND T-TESTS

Value of Interaction	F groups[a]	F periods	F gps. X per.	Standard Deviations[b] MA	WA	WC	MA vs WA t[c]	df[d]	MA vs WC t	df	WA vs WC t	df
Intellectual Value												
High	4.0**	3.3 **	0.6	7.5	1.3	1.7	2.1*	5	2.7**	6	1.8*	9
Moderate (converse)	9.0***	2.9 *	1.1	1.0	2.3	0.3	0.0	9	7.8***	6	3.0**	5
Moderate (play)	1.7	15.6***	1.4	4.7	3.5	1.3	0.2	11	2.0*	6	1.9*	6
Low (basic care)	6.5***	2.4	1.6	2.1	2.3	1.1	1.1	12	4.3***	9	2.4**	7
Low (gross motor)	2.2	0.6	6.3***	1.5	1.0	1.4	0.6	10	1.4	12	2.1*	9
Low (unspecific)	12.4***	0.7	2.5 *	0.1	0.3	0.2	4.0***	8	5.2***	9	0.3	9
Social Value												
Positive	5.8**	2.5*	0.7	0.3	0.9	4.2	1.8	8	2.4**	7	2.0	5
Neutral	3.3 *	2.6*	1.3	0.2	0.7	0.3	1.7	8	4.3***	11	0.2	6
Negative	0.4	0.5	0.8	1.1	0.7	0.9	0.6	10	0.9	11	0.4	10
Total Interaction	4.2**	0.6	1.5	10.6	7.4	7.5	1.2		2.9**		1.9	

[a] The groups are Middle-class A's, Working-class As, and Working-class Cs.

[b] Standard Deviation of the averages calculated for each S over three observation periods.

[c] Means of individual S's averages over three observation periods are compared.

[d] Degrees of freedom change to adjust for heterogeneity of variance.

$*p < .10$, $**p < .05$, $***p < .01$. The p values are for two-tailed t-tests except for comparisons of As and Cs on interactions of high intellectual value where the t-tests are one-tailed.

Table IV-23 One-Year-Old Starters: Comparison of As and Cs on Interactions that differ in Content but are alike in Intellectual Value

MEANS

	Middle Class A[a] n=8 Observation Period (months)				Working Class A n=6 Observation Period (months)				Working Class C n=6 Observation Period (months)			
Content of Interaction[b]	12-15	18-21	24-27	$\bar{X}$ of 3 Periods	12-15	18-21	24-27	$\bar{X}$ of 3 Periods	12-15	18-21	24-27	$\bar{X}$ pf 3 Periods
High Intellectual Value												
Verbal, Symbolic	3.3[c]	6.0	5.2	4.8	1.6	1.1	1.1	1.3	0.4	0.6	1.8	0.9
Spatial, Perceptual	3.0	2.5	4.3	3.3	1.2	1.6	2.8	1.9	0.6	2.0	2.0	1.6
Concrete Reasoning	1.7	2.4	1.7	1.9	2.0	1.4	1.1	1.5	0.3	1.1	0.5	0.6
Expressive Skills	0.2	0.3	1.8	0.8	0.4	1.5	0.6	0.8	0.2	0.6	0.4	0.4
Executive Skills	1.0	2.0	2.4	1.8	0.7	0.8	1.2	0.9	0.3	1.5	2.0	1.2
Total-High	9.3	13.3	15.4	12.6	6.0	6.5	6.8	6.4	1.7	5.8	6.6	4.7
Moderate Intellectual Value												
Explore Household	8.9	6.4	3.8	6.4	8.1	6.0	4.2	6.1	3.8	5.1	3.3	4.1
Play toys	5.2	5.1	2.7	4.3	7.2	3.0	1.1	3.8	4.0	2.2	1.0	2.4
Explore Nature	0.0	0.0	0.9	0.3	0.4	0.7	0.7	0.6	0.9	0.4	1.0	0.7
Total-Moderate	14.1	11.6	7.3	10.9	15.7	9.7	6.0	10.5	8.6	7.8	5.3	7.2

[a] Middle-class children are from Hollingshead-Redlich Classes I and II.
Working-class children are from Hollingshead-Redlich Classes III, IV and V.

[b] Coding criteria for categories are described in the manual in the Appendix.

[c] The amount of time spent by each Subject in interactions of specified value is summed over the five observations of a three-month period then converted to a percentage of total observation time for that period (usually 9000 seconds). Each entry is an average of percentages for individual Ss.

Table IV-24 One-Year-Old Starters: Comparison of As and Cs on Interactions that Differ in Content but are Alike in Intellectual Value

STANDARD DEVIATIONS AND RESULTS OF F AND T-TESTS

Content of Interaction	F groups[a]	F periods	F gps. X per.	Standard Deviations[b] MA	WA	WC	MA vs WA t[c]	df[d]	MA vs WC t	df	WA vs WC t	df
High Intellectual												
Verbal, Symbolic	4.2**	0.4	0.5	3.9	0.4	0.7	2.4*	5	2.6**	5	1.1	8
Spatial, Perceptual	3.0*	3.1*	0.6	1.7	0.4	1.0	2.1*	6	2.2**	10	0.6	7
Concrete Reasoning	1.4	0.7	0.5	1.8	1.2	0.3	0.5	10	1.9*	5	1.7*	6
Expressive Skills	1.2	3.0*	3.5**	0.6	0.6	0.2	0.2	12	1.5*	7	1.6*	6
Executive Skills	0.9	2.4	0.2	1.6	0.7	0.7	1.4	7	0.8	8	0.8	10
Total-High	4.0**	3.3*	0.6	7.5	1.3	1.7	2.1*	5	2.7**	6	1.8*	9
Moderate Intellectual												
Explore Household	1.1	4.9**	1.1	4.1	1.7	1.1	0.2	7	1.4	6	2.3**	9
Play Toys	2.0	22.3***	2.8**	1.8	1.9	0.7	0.5	12	2.5**	7	1.4	6
Explore Nature	0.7	1.8	0.7	0.2	0.9	0.8	0.9	8	1.2	8	0.2	10
Total-Moderate	1.7	15.6***	1.4	4.7	3.5	1.3	0.2	11	2.0**	6	1.9**	6

[a] The groups are Middle-class As, Working-class As, and Working-class Cs.

[b] Standard deviation of the averages calculated for each S over three observation periods.

[c] Means of individual S's averages over three observation periods are compared.

[d] Degrees of freedom change to adjust for heterogeneity of variance.
*p < .10, **p < .05, ***p < .01. The p values are for two-tailed t-tests except for comparisons of As and Cs on interactions of high intellectual value where the t-tests are one-tailed.

A child spends nearly three times as much time on intellectually valuable interactions with others as the working-class C child (12.6% versus 4.7%; $t = 2.70$; $p < .025$, one tail). This difference starts as early as 12-15 months (9% versus 2%) and holds through the two subsequent observation periods, although the means for both groups are increasing. To put it more vividly, at 24-27 months the middle-class A child spends about nine minutes (15%) of an observation hour in intellectually promising interactions such as "playing house" or building with blocks, while the average working-class C child spends half that time on similar pursuits.

Differences between the middle-class A child and the working-class C child on interactions of highly intellectual value, and on social activities are also remarkably like the differences reported for the two-year-old starters. If anything, they are more dramatic. Thus at age 24-27 months, the middle-class A child devotes about eight times as much time to interactions that are highly "intellectual" in nature rather than social-physical (15% versus 1.8%). In contrast, the working-class C child spends slightly more time on social-physical interactions than on those of a more highly intellectual nature (7.9% versus 6.6%). (See Tables IV-21,22)

Style and Attitude: Techniques and Encouragement

Differences between the styles of behavior of interactors with middle-class A and working-class C children replicate the differences we reported for the two-year-old starters almost exactly. Interactors with the middle-class As spend significantly more observation time than interactors with the working-class Cs participating in their children's activities (averaging the three observation periods, 16.4% versus 9.5%; $t = 2.08$; $p < .10$); more time facilitating their activities (15.4% versus 11.2%; $t = 2.24$, $p < .10$); more time observing their activities (6.7% versus 1.8%; $t = 4.80$; $p < .01$); no less time restricting their activities (5.0% versus 5.8%; $t = 1.0$; $p < .50$) and more time generally encouraging their activities (31.4% versus 18.9%; $t = 2.5$; $p < .05$). (See Tables IV-25,26,27,28 and IV-31,32)

But, as with the two-year-old starters, the most impressive findings concern the selective application of participation and encouragement to activities with the child that are intellectually profitable. For example, when the middle-class A child is 24-27 months old, other people typically spend 9.4% of an observation hour actively participating in intellectually promising activities with him, while their counterparts with the working-class C child spend only 3.7% of that time. Similarly, at the same period in his life, interactors with the A child spend 14.3% of observation time overtly encouraging his intellectual pursuits, in contrast to 5.4% of time spent by those who interact with the working-class C child. (See Tables IV-29,30)

Working-Class As versus Working-Class Cs

We can summarize the findings for the comparison of the middle-class As and working-class Cs among the one-year-old starters by saying that they reproduce with uncanny faithfulness the results already reported for the two-year-old starters. But what of the fairer comparison of working-class As and Cs? Do the working-class As resemble the middle-class As as was the case for the two-year-old starters? Are the differences between them and the working-class Cs as striking as the differences between the middle-class As and the working-class Cs?

The short answer to this question is that we really do not know. So far as the groups of working-class As and Cs as they are presently constituted are concerned it is clear that the experiences of the working-class As fall somewhere between that of the middle-class As and the working-class Cs. On

Table IV-25 One-Year-Old Starters: Comparison of As and Cs on General Categories of Techniques used by Others in Interacting with them

MEANS

Technique Category[b]	Middle Class A[a] n=8 Observation Period (months)				Working Class A n=6 Observation Period (months)				Working Class C n=6 Observation Period (months)			
	12-15	18-21	24-27	$\bar{X}$ of 3 Periods	12-15	18-21	24-27	$\bar{X}$ of 3 Periods	12-15	18-21	24-27	$\bar{X}$ of 3 Periods
Direct Participation	16.2[c]	15.7	17.4	16.4	11.6	9.1	13.2	11.3	5.5	10.3	12.7	9.5
Facilitation	18.4	14.8	13.0	15.4	16.0	14.8	11.5	14.1	11.6	12.0	10.0	11.2
Observation	7.0	7.7	5.4	6.7	5.9	5.4	3.0	4.8	2.7	1.6	1.1	1.8
Restriction	5.3	5.0	4.6	5.0	9.6	6.7	5.0	7.1	4.0	6.6	6.8	5.8

[a] Middle-class children are from Hollingshead-Redlich Classes I and II.
Working-class children are from Hollingshead-Redlich Classes III, IV and V.

[b] Coding criteria for categories are described in the manual in the Appendix.

[c] For each Subject the amount of time during which the interactor used techniques belonging to the specified category is summed over the five observations of a three-month period and converted to a percentage of total observation time for that period (usually 9000 seconds). Each entry is an average of individual percentages.

Table IV-26 One-Year-Old Starters: Comparisons of As and Cs on General Types of Techniques used by Others in Interacting with Them

STANDARD DEVIATIONS AND RESULTS OF F AND T-TESTS

				Standard Deviations[b]			MA vs WA		MA vs WC		WA vs WC	
Technique Category	F groups[a]	F periods	F gps. X per.	MA	WA	WC	t[c]	df[d]	t	df	t	df
Direct Participation	2.4	2.0	1.0	8.1	2.4	3.0	1.6	6	2.1*	7	1.0	10
Facilitation	2.2	3.0*	0.4	1.8	4.4	3.9	0.6	9	2.2*	9	1.1	10
Observation	9.3***	3.7**	0.5	2.6	1.7	0.7	1.5	10	4.8***	6	3.7***	7
Restriction	2.6	0.6	4.0***	1.8	1.6	1.0	2.1*	12	1.0	9	1.5	8

[a] The groups are Middle-class As, Working-class As, and Working-class Cs.

[b] Standard deviation of the averages calculated for each S over three observation periods.

[c] Means of individual S's averages over three observation periods are compared.

[d] Degrees of freedom change to adjust for heterogeneity of variance.
*p ∠.10, **p ∠.05, ***p ∠.01. The p values are for two-tailed t-tests.

Table IV-27 One-Year-Old Starters: Comparison of As and Cs on the Attitude of Interactors towards them

MEANS

Attitude	Middle Class A[a] n=8 Observation Period (months) 12-15	18-21	24-27	$\bar{X}$ of 3 Periods	Working Class A n=6 Observation Period (months) 12-15	18-21	24-27	$\bar{X}$ of 3 Periods	Working Class C n=6 Observation Period (months) 12-15	18-21	24-27	$\bar{X}$ of 3 Periods
Encouragement	34.8[b]	29.0	30.3	31.4	26.6	22.6	22.5	23.9	15.6	21.2	19.9	18.9
Discouragement	6.3	5.8	5.7	5.9	11.2	8.3	6.7	8.7	5.0	7.2	7.5	6.6
Neutral	6.0	8.4	4.5	6.3	5.4	5.2	3.7	4.8	3.2	2.2	3.1	2.8

[a] Middle-class children are from Hollingshead-Redlich Classes I and II.
Working-class children are from Hollingshead-Redlich Classes III, IV and V.

[b] For each Subject the amount of time during which the interactor encouraged, discouraged, or was neutral towards him is summed over the five observations of a three-month period and converted to a percentage of total observation time (9000 seconds). Each entry is an average of individual percentages.

Table IV-28 One-Year-Old Starters: Comparison of As and Cs on the General Attitude of Others in Interacting with Them

STANDARD DEVIATIONS AND RESULTS OF F AND T-TESTS

				Standard Deviations[b]			MA vs WA		MA vs WC		WA vs WC	
Attitude	F groups[a]	F periods	F gps. X per.	MA	WA	WC	t[c]	df[d]	t	df	t	df
Encouragement	3.3*	0.2	0.9	10.6	5.8	6.3	1.6	9	2.5**	10	1.3	10
Discouragement	2.9*	0.4	2.3*	2.3	2.3	1.2	2.1*	12	0.6	9	1.9	7
Neutral	6.2***	1.4	1.2	1.7	1.9	1.3	1.4	12	4.0***	11	1.9	9

[a] The groups are Middle-class As, Working-class As, and Working-class Cs.

[b] Standard deviation of the averages calculated for each S over three observation periods.

[c] Means of individual Ss' averages over three observation periods are compared.

[d] Degrees of freedom change to adjust for heterogeneity.
*p < .10, **p < .05, ***p < .01. The p values are for two-tailed tests.

3

Table IV-29 One-Year-Old Starters: Comparison of As and Cs on the Intellectual and Social Value of Interactions that are Actively Participated in and Encouraged by Others

MEANS

Quality of Interaction x Type of Interaction	Middle Class A[a] n=8 Observation Period (months) 12-15	18-21	24-27	$\bar{X}$ of 3 Periods	Working Class A n=6 Observation Period (months) 12-15	18-21	24-27	$\bar{X}$ of 3 Periods	Working Class C n=6 Observation Period (months) 12-15	18-21	24-27	$\bar{X}$ of 3 Periods
High Intellectual												
x Participation	6.0[b]	8.8	9.4	8.1	2.9	3.7	3.2	3.3	1.0	3.9	3.7	2.9
x Encouragement	9.1	12.1	14.3	11.8	4.9	5.9	5.7	5.5	1.6	6.1	5.4	4.4
Moderate Intellectual (Play)												
x Participation	4.6	2.8	2.2	3.2	3.9	1.8	1.7	2.5	2.0	1.7	1.3	1.6
x Encouragement	9.1	5.2	4.4	6.2	6.8	4.5	2.7	4.7	4.2	3.1	1.9	3.1
Positive Social												
x Participation	0.0	0.1	1.1	0.4	0.7	0.5	1.1	0.8	1.3	4.0	5.1	3.5
x Encouragement	0.0	0.3	1.6	0.6	1.0	1.1	1.9	1.4	2.8	6.4	7.6	5.6

[a] Middle-class children are from Hollingshead-Redlich Classes I and II.
Working-class children are from Hollingshead-Redlich Classes III, IV and V.

[b] For each Subject the amount of time during which the interactor used the specified technique in an interaction of given value for the child is summed over the five observations of a three-month period and converted to a percentage of total observation time for that period (usually, 9000 seconds). Each entry is an average of individual percentages.

Table IV-30 One-Year-Old Starters: Comparison of As and Cs on the Intellectual and Social Value of Interactions that are Actively Participated in and Encouraged by Others

STANDARD DEVIATIONS AND RESULTS OF F AND T-TESTS

Quality of Interaction x Type of Interaction	F groups[a]	F periods	F gps. X per.	Standard Deviations[b]			MA vs WA		MA vs WC		WA vs WC	
				MA	WA	WC	t^c	df^d	t	df	t	df
High Intellectual												
x Participation	4.2**	1.8	0.3	4.9	1.1	1.7	2.5**	6	2.6**	7	0.4	8
x Encouragement	4.4**	2.6*	0.5	6.8	1.4	2.3	2.4*	6	2.7**	7	0.9	8
Moderate Intellectual (Play)												
x Participation	1.0	3.2**	0.4	2.8	1.2	0.5	0.6	8	1.5	6	1.4	7
x Encouragement	2.0	6.7***	0.4	3.7	2.2	0.7	0.9	10	2.2*	6	1.6	6
Positive Social												
x Participation	6.2***	3.0*	1.4	0.2	0.6	2.8	1.4	8	2.4**	7	2.1*	5
x Encouragement	5.9**	1.8	0.6	0.3	0.8	4.6	1.8*	8	2.4**	7	2.0*	5

[a] The groups are Middle-class As, Working-class As, and Working-class Cs.

[b] Standard deviation of the averages calculated for each S over three observation periods.

[c] Means of individual S's averages over three observation periods are compared.

[d] Degrees of freedom change to adjust for heterogeneity of variance.
$*p < .10$, $**p < .05$, $***p < .01$. The p values are for two-tailed t-tests except for comparisons of As and Cs on interactions of high intellectual value, where the t-tests are one-tailed.

Table IV-31 One-Year-Old Starters: Comparison of As and Cs on Specific Techniques Used by Others in Interacting with them

MEANS

Technique[b]	Middle Class A[a] n=8 Observation Period (months)				Working Class A n=6 Observation Period (months)				Working Class C n=6 Observation Period (months)			
	12-15	18-21	24-27	X̄ of 3 Periods	12-15	18-21	24-27	X̄ of 3 Periods	12-15	18-21	24-27	X̄ of 3 Periods
Direct Participation												
Teaching-unspecific	0.2[c]	0.0	0.3	0.1	0.3	0.3	0.0	0.2	0.0	0.1	0.0	0.0
Didactic Teaching	3.8	6.7	6.7	5.7	1.2	1.7	1.2	1.4	0.8	1.0	1.8	1.2
Justification	0.0	0.3	1.1	0.5	0.1	0.4	1.4	0.6	0.1	0.1	0.5	0.3
Active Participation	5.2	4.8	3.3	4.4	7.5	4.2	6.5	6.1	3.0	6.9	7.2	5.7
Information Giving	2.9	2.2	5.2	3.4	1.5	2.4	4.0	2.6	1.7	2.2	3.1	2.3
Involvement-unspecific	4.2	1.6	0.8	2.2	1.0	0.1	0.0	0.4	0.0	0.0	0.0	0.0
Total-Direct Participation	16.2	15.7	17.4	16.4	11.6	9.1	13.2	11.3	5.5	10.3	12.7	9.5
Restriction												
Restriction-unspecified	0.8	1.4	0.5	0.9	2.6	0.9	0.4	1.3	1.0	0.9	0.6	0.8
Prohibition	1.0	1.5	1.7	1.4	3.0	1.9	2.3	2.4	0.9	2.1	2.7	1.9
Negative Reinforcement	1.2	0.9	1.1	1.1	2.1	2.6	1.1	1.9	1.6	2.6	2.6	2.3
Distraction, Ignoring	2.1	0.9	1.0	1.3	1.7	1.1	1.2	1.4	0.5	1.0	0.9	0.8
Refusing to Help	0.2	0.2	0.3	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0
Total-Restriction	5.3	5.0	4.6	5.0	9.6	6.7	5.0	7.1	4.0	6.6	6.8	5.8

[a] Middle-class children are from Hollingshead-Redlich Classes I and II.
Working-class children are from Hollingshead-Redlich Classes III, IV and V.

[b] Coding criteria for categories are described in the **manual** in the Appendix.

[c] For each Subject the amount of time during which the interactor used the specified technique is summed over the five observations of a three-month period and converted to a percentage of total observation time for that period (usually, 9000 seconds). Each entry is an average of percentages for individual Ss.

Table IV-31 (cont.) One-Year-Old Starters: Comparison of As and Cs on Specific Techniques Used by Others in Interacting with Them

MEANS

	Middle Class A[a] n=8 Observation Period (months)				Working Class A n=6 Observation Period (months)				Working Class C n=6 Observation Period (months)			
Technique[b]	12-15	18-21	24-27	$\bar{X}$ of 3 Periods	12-15	18-21	24-27	$\bar{X}$ of 3 Periods	12-15	18-21	24-27	$\bar{X}$ of 3 Periods
Facilitation (Present)												
Providing Materials	2.6[c]	1.4	1.8	1.9	1.7	1.5	1.1	1.4	0.7	0.6	1.2	0.8
Changing Location	1.3	1.1	0.6	1.0	1.8	1.3	1.0	1.4	1.9	1.1	0.4	1.1
Providing Service	8.5	5.8	3.5	5.0	5.3	5.6	4.1	5.0	3.5	3.2	3.2	3.3
Positive Reinforcement	2.5	1.9	1.3	1.9	1.8	1.6	1.0	1.5	1.8	2.3	2.6	2.2
Total-Facilitation (Present)	14.9	10.2	7.3	10.8	10.6	10.0	7.2	9.3	7.9	7.2	7.4	7.4
Facilitation (Future)												
Directive-unspecific	1.1	0.7	0.5	0.8	0.9	0.2	0.1	0.4	0.0	0.1	0.0	0.1
Suggestion, Command	2.2	3.7	4.9	3.6	3.9	4.4	4.0	4.1	3.5	4.6	2.5	3.5
Focusing on a Task	0.2	0.2	0.3	0.2	0.6	0.1	0.2	0.3	0.1	0.1	0.0	0.1
Total-Facilitation (Future)	3.5	4.6	5.7	4.6	5.3	4.7	4.3	4.8	3.7	4.8	2.6	3.7
Total Facilitation (All)	18.4	14.8	13.0	15.4	16.0	14.8	11.5	14.1	11.6	12.0	10.0	11.2
Observation												
Observing	6.2	7.4	5.4	6.4	5.8	5.4	3.0	4.7	2.7	1.6	1.1	1.8
Interpreting-unspec.	0.8	0.2	0.0	0.3	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0
Total-Observation	7.0	7.7	5.4	6.7	5.9	5.4	3.0	4.8	2.7	1.6	1.1	1.8

[a] Middle-class children are from Hollingshead-Redlich Classes I and II.
Working-class children are from Hollingshead-Redlich Classes III, IV and V.

[b] Coding criteria for categories are described in the manual in the Appendix.

[c] For each Subject the amount of time during which the interactor used the specified technique is summed over the five observations of a three-month period and converted to a percentage of total observation time for that period (usually, 9000 seconds). Each entry is an average of percentages for individual Ss.

2

Table IV-32 One-Year-Old Starters: Comparison of As and Cs on Specific Techniques Used by Others in Interacting with Them

STANDARD DEVIATIONS AND RESULTS OF F AND T-TESTS

Technique	F groups[a]	F periods	F gps.X per.	Standard Deviations[b] MA	WA	WC	MA vs WA t[c]	df[d]	MA vs WC t	df	WA vs WC t	df
Direct Participation												
Teaching-unspecific	1.4	0.1	1.0	0.2	0.3	0.0	0.5	10	1.8	6	1.5	5
Didactic Teaching	7.3***	1.1	0.5	3.5	0.4	0.5	3.3**	5	3.4**	5	0.6	9
Justification	4.5**	31.2***	2.2 *	0.3	0.1	0.1	1.1	9	1.9*	8	4.2***	10
Active Participation	0.7	0.1	3.6**	4.4	6.1	5.7	1.2	11	0.8	10	0.2	10
Information Giving	1.1	14.3***	1.4	1.4	0.4	1.5	1.4	6	1.2	12	0.4	6
Involvement-unspec.	4.8**	2.4	1.1	2.2	0.4	0.0	2.4	6	3.0**	5	1.6	5
Total-Direct Participation	2.4	2.0	1.0	8.1	2.4	3.0	1.6	6	2.1*	7	1.0	10
Restriction												
Restriction-unspec.	1.1	3.9**	2.5*	0.5	0.8	0.2	0.9	10	0.4	7	1.3	6
Prohibition	2.5	1.7	3.1**	0.8	0.9	0.3	1.9*	12	1.5	7	1.2	6
Negative Reinforcement	4.2**	1.1	2.1	0.6	0.5	0.9	2.4**	12	2.5**	11	0.8	8
Distraction, Ignoring	3.4	2.2	2.5*	0.3	0.5	0.4	0.1	9	2.4**	10	1.9	10
Refusing to Help	8.5***	0.1	0.2	0.1	0.1	0.0	2.3**	9	4.6***	5	2.7**	5
Total-Restriction	2.6	0.6	4.0***	1.8	1.6	1.0	2.1*	12	1.0	9	1.5	8

[a] The groups are Middle-class As, Working-class As, and Working-class Cs.

[b] Standard deviation of the averages calculated for each S over three observation periods.

[c] Means of individual Ss averages over three observation periods are compared.

[d] Degrees of freedom change to adjust for heterogeneity of variance.
*$p < .10$, **$p < .05$, ***$p < .01$. The p values are for two-tailed tests.

Table IV-32 One-Year-Old Starters: Comparison of As and Cs on Specific Techniques Used by Others in Interacting with Them

STANDARD DEVIATIONS AND RESULTS OF F AND T-TESTS

Technique	F groups[a]	F periods	F gps.X per.	Standard Deviations[b] MA	WA	WC	MA vs WA t[c]	df[d]	MA vs WC t	df	WA vs WC t	df
Facilitation (Present)												
Providing Materials	4.6**	0.8	0.7	0.6	0.8	0.2	1.1	11	4.4***	7	1.6	6
Changing Location	0.8	5.8**	0.4	1.0	1.4	1.1	1.1	12	0.5	7	1.0	7
Providing Service	2.8*	2.4	1.1	1.2	2.3	2.1	0.8	9	2.5**	10	1.2	10
Positive Reinforcement	0.7	0.2	0.6	0.7	0.7	1.6	1.0	12	0.4	9	0.9	7
Total-Facil. (Present)	2.2	3.9**	1.3	1.7	2.8	3.4	1.1	10	2.0*	9	0.9	10
Facilitation (Future)												
Directive-unspec.	4.0**	1.9	0.6	0.5	0.4	0.1	1.3	12	3.4**	6	1.7	6
Suggestion, Command	0.4	2.2	2.8**	0.9	1.3	1.0	0.8	11	0.0	12	0.7	9
Focusing on a Task	1.0	0.7	0.8	0.2	0.4	0.1	0.2	10	1.9	6	1.1	5
Total-Facil. (Future)	0.9	0.5	2.0	1.4	1.8	1.0	0.2	11	1.2	11	1.2	8
Total Facilitation (All)	2.2	3.0*	0.4	1.8	4.4	3.9	0.6	9	2.2*	9	1.1	10
Observation												
Observing	8.9***	2.9	0.6	2.5	1.6	0.7	1.4	10	4.7***	6	3.7***	7
Interpreting-unspec.	5.7**	7.7***	4.7***	0.3	0.1	0.0	2.4**	8	3.4**	5	1.4	5
Total-Observation	9.3***	3.7**	0.5	2.6	1.7	0.7	1.5	10	4.8***	6	3.7***	7

[a] The groups are Middle-class As, Working-class As, and Working-class Cs.

[b] Standard deviation of the averages calculated for each S over three observation periods.

[c] Means of individual S's averages over three observation periods are compared.

[d] Degrees of freedom change to adjust for heterogeneity of variance.
$*p < .10$, $**p < .05$, $***p < .01$. The p values are for two-tailed t-tests.

almost every item in Table IV-21, the average for the three observation periods of the working-class As falls between that of the middle-class As and the working-class Cs and it is usually not significantly different from either. But, as we have pointed out with monotonous regularity, six months from now the composition of both working-class groups may be substantially changed and the results may look quite different. So it seems premature and futile to discuss present findings in any great detail and we shall not do so further.

Summary

In this chapter we have presented quantitative results from a longitudinal study of the environments and experiences of young children observed in the natural milieu of their homes and neighborhoods. Our findings are incomplete in that some of our Subjects who started in our study at the age of one are not yet old enough to have completed all phases of the study so that the composition of the subsample to which they belong -- half of the entire sample of our study -- may be considered highly fluid and their data subject to reanalysis within the lifetime of this project.

However the findings for the other half of our sample -- those children who started in our study at age two -- are final, clear-cut, and eloquent. We can summarize these findings by saying that the role played by the human environment in the experiences of these children may be critical to their intellectual development. As early as the age of 24-27 months the experiences of certain of these children who develop very well intellectually ("A" children) and others who do not ("C" children) differ strikingly. Mothers, fathers, babysitters and other people who are in contact with these A children spend more time interacting with them in the context of intellectually stimulating activities more time directly participating in these activities, and more time selectively encouraging these activities than interactors with C children.

The most important implication of these findings is that children who later grow up to be exceptionally competent intellectually probably do not become so because of innate capabilities only. Starting as early as two years of age (and probably earlier as our data on our one-year-old starters are beginning to suggest), these children have daily experiences in their homes which selectively promote their intellectual development. The curriculum of their homes is not hidden or unsystematic; it is observable and focused on their intellectual advancement as its primary goal.

Notes to Chapter IV

1. Data from the Object Interaction Scale has been embedded in a much more comprehensive instrument, the HOME Scale. An analysis of these data is now in progress.

2. We were compelled to stop observing some of our one-year-old starters at 27 months instead of 36 months because difficulties in recruitment meant that they entered our study late and research funds and time ran out when they were still only 27 months old. These Subjects will be tested at 36 months and fortunately are part of another observational study conducted by the author which will provide further observational information on them.

3. See above footnote.

4. The data reported in this chapter are for a larger number of children and cover more periods of observation than the data reported in White (1972), our collaborator in this project. White eliminated 8 children from his data analysis because they did not meet his competence criteria and reports data for only two periods of observation (instead of three or four periods) for the one-year-old starters.

5. The observers are: Nancy Apfel, Itty Chan Barnett, Christine Halfar, Geraldine Kearse and Jean Carew Watts.

6. The data treatment is in fact a bit more complicated. Time spent on "highly intellectual" activities as a percentage of total observation or interaction time is calculated for each individual subject, and then group means are obtained.

7. The IQs of two deviant Subjects fell between 100 and 115 but their scores on the other criterion tests justified their respective classification.

8. The difference between the mean for the working-class As and the working-class Cs is actually bigger than that between the middle-class As and working-class Cs, yet the difference yields a smaller t and a p value even smaller than that _t_ normally receives with 11 degrees of freedom. The reasons are that there is much more variability in scores among the working-class As than for the other two groups, and our statistical testing procedure (Welch, 1947) corrects for heterogeneity of variance by decreasing the degrees of freedom.

Chapter V

FOUR CHILDREN: FOUR ENVIRONMENTS

In the preceding chapters we have concentrated on describing the methodology and preliminary quantitative findings of our research on the environments of children who are developing exceptionally well, and those who are developing poorly. In this chapter we shall examine in a more qualitative fashion the human and physical environments of four of these children. We shall first describe in some detail the background and family life of each child, then we shall use excerpts from our actual observation records to give the reader as vivid a sense as we can of what each child looks like "in action."

The main theme our case studies will exemplify is the many roles the mother plays in influencing the child's development: her _direct_ roles, as manifested in her observed behavior toward the child; her _managerial_ role as designer of the child's physical and social environment and organizer of his daily routine; and her _diffuse_ role embodied in herself as a total person with a history, a set of values, a certain degree of awareness of her effect on her child's development, and a certain set of socioeconomic and cultural constraints on her actions. For practical reasons, we focused our discussion of our quantitative findings almost entirely on the mother's direct and indirect roles expressed in her observed behavior toward the child. But in our case studies we shall provide information relevant to all of the mother's roles and point to instances where the mother's managerial or diffuse role seems particularly important in influencing her child's development.

The Children of the Case Studies

We shall include four children in our case studies, a one-year-old "A" and a one-year-old "C", a two-year-old "A" and a two-year-old "C". These children were selected to exemplify the two themes described above, and are not necessarily typical of all "A" and "C" children at one and two years of age. Indeed, they could not possibly be typical since there is no such thing as a single type of "A" or "C" child. Even a cursory examination of our data on individual children convinces us that there are many different considerations of environmental factors associated with "A" and "C" children and there is no one critical dimension which separates the two. Lack of space and the incomplete nature of our data forces us to select only a few children from among those available, and the reader should not conclude that children of the case studies are the "best" or "worst" or even most representative of their respective groups.

Sandra - a one-year-old "A" girl

The first child we shall describe is Sandra[1]. Sandra was one-year-old when we first started observing her. Her only sibling, Rachel, was attending a locally well-known nursery school and the teachers there recommended Rachel as a child who was developing especially well and who, conveniently for us, had a younger sister just turning one. On the basis of the teacher's ratings of her sister, we predicted that Sandra would develop into an "A" child. At the start of our observations when Sandra was 12 months, her test scores were among the top third of all children in our study. These scores validate our prediction of Sandra as an "A" child.

Sandra's Background: Physical Environment

When we first started observing Sandra, the family lived in a six-room apartment in a residential area of Greater Boston. The neighborhood included some big mansions surrounded by spacious gardens, smaller single family houses, and oldish apartment buildings. Sandra's family lived on the first floor of an older apartment building which was beautifully situated in terms of affording Sandra a rich, pleasant and varied environment. Immediately adjacent was a park full of trees and a rolling meadow, a rose garden and a well-equipped modern playground, while, just a few blocks away was a busy commercial district, full of small stores, shoppers and trolleys on the street. Variety was also much in evidence within Sandra's apartment. The apartment was fairly small, consisting of a bedroom for her parents and one for the two girls, a kitchen and dining area, a small living room and a tiny den out on the porch. But Sandra was free to roam wherever she wished in the apartment as was evident from the childish clutter and masses of toys often scattered everywhere.

We visited Sandra in this location from the time she was 12-months-old to when she was 15 months. However, by the time we began our second cycle of observations, 18-21 months, Sandra's family had moved to the suburbs. They now live in an extremely large, beautifully furnished house set in spacious grounds, complete with a small hill for sliding and skiing, a hammock, swings and sandbox. Sandra shares a bedroom, playroom and bathroom with her sister, an arrangement obviously made by choice rather than necessity. The playroom is a delightful place with a picture window in an adjoining sunporch overlooking the grounds, a playhouse, a child's kitchen area, shelves loaded with a fabulous area of small manipulable toys, books, dolls and puppets, a swing hanging from the doorway, a tiny-tot slide, and a full-length mirror. In addition, Sandra has the run of the house which includes two sunny sitting rooms and an enormous kitchen decorated with her sister's artwork and mobiles hanging from the ceiling. Of all the children in our study, this child must be regarded as one of the most fortunate so far as having a varied, stimulating, and accessible physical environment is concerned.

What now of her human environment, the people with whom Sandra comes into contact?

Human Environment

When we first started observing Sandra, her family was classified in Class II. Both parents were college educated, her father had a Ph.D. and was doing post-graduate work in science, and their income was between $7,000 and $12,000 per year. However, a large financial windfall enabled the family to move into a wealthy neighborhood during the course of our study, and this family is probably now in Class I. The religious and ethnic background of Sandra's parents is Northern European/Protestant in the case of her mother and Jewish in the case of her father, but neither parent now professes a religious faith.

The person with whom Sandra spends most time is her mother. Except for one observation when a regular student babysitter was taking care of her, all our observations were done when Sandra was in her mother's charge. Not surprising, during these observations Sandra mostly interacted with her mother (or played alone) although often, her four-year-old sister or a one-year-old playmate was present, and for short periods of time she played with them also. From time to time we caught glimpses of her father, grandfather and other adults, but they seldom stayed more than a few minutes while we were there and enter only briefly into our recorded observations.

Observations on Sandra

Sandra is one of the one-year-olds in our study who we predict will develop exceptionally well intellectually and socially. Her interaction scores with her mother on such things as the amount of time spent on "highly intellectual activities" and teaching are in the top third of the range for all one-year-olds, and on the basis of test scores and "task" observations she is undoubtedly an intellectually superior child.

Table V-1 shows that when Sandra was 12-15 months old her mother

Table V-1. Number of Minutes per Observation Hour Spent by Children of the Case Studies in Various Types of Interaction with their Mothers

	Case Study A s[a]				Case Study C s[b]			
	12-15	18-21	24-27	30-33	12-15	18-21	24-27	30-33
Total interaction time	29.4	18.0	17.4	10.0	10.8	13.8	12.6	12.6
Highly intellectual activities	5.9	3.8	2.8	0.9	1.3	1.4	1.1	1.7
Teaching	1.9	2.2	1.2	1.0	0.2	1.0	0.0	0.4
Restriction	3.5	1.4	1.1	0.9	1.3	1.4	3.5	3.8
Mother encourages	19.7	11.2	10.6	7.3	6.7	7.0	7.3	6.7
Mother discourages	7.0	2.0	1.3	2.2	1.4	1.6	3.8	4.4
Mother initiates	14.9	10.4	9.2	3.2	4.1	4.3	6.1	5.6
Subject initiates	14.3	7.3	4.9	6.7	6.7	9.5	6.4	6.9
Mother successful in control	4.4	2.0	1.7	2.3	1.9	1.9	3.5	3.2
Mother unsuccessful in control	2.0	1.9	1.1	0.6	0.2	0.5	1.1	1.1

[a] Sandra at 12-15 and 18-21 months; Nancy at 24-27 and 30-33 months.

[b] Cathy at 12-15 and 18-21 months; Robert at 24-27 and 30-33 months.

typically spent about 29 minutes out of an observation hour interacting with her in some way, about 6 minutes engaging with her in highly intellectual activities such as building towers with blocks or labeling objects, about 2 minutes in direct teaching, and about 3 minutes restricting Sandra's activities. Over this first three-month period, Mrs. S encouraged 3 times as much of Sandra's activities as she discouraged, initiated about as many as Sandra herself initiated, and was successful in only half of her attempts to control Sandra.

In the second observational period when Sandra was 18-21 months old, Sandra's interaction scores with her mother are still high enough to qualify her as an "A" but are considerably lower than when she was 12-15 months old. In this second phase, Sandra's mother spent 18 minutes out of an observation hour interacting with her in some fashion, 4 minutes engaging in highly intellectual activities, 2 minutes in teaching, and 1 minute restricting her. Over this three-month span, Mrs. S encouraged many more of Sandra's activities than she discouraged, initiated as many as Sandra initiated, and was again successful in only half of her attempts at controlling her.

What we would like to do in the remainder of this case study is to give as vivid a picture as possible of what Mrs. S and Sandra look like "in action" by providing several verbatim excerpts from our minute-to-minute commentaries on their behavior. These excerpts come from various observations made when Sandra was 12-15 months-old and when she was 18-21 months-old. The picture we shall see is of a child who is obviously very bright and self-directed even at one year. She is very fond of small, manipulable objects which call for fine motor activity, and to an extent unusual for her age, is often involved in little pre-scientific experiments in which she appears to be struggling to understand the laws of nature. Equally indicative of intellectual talent is her interest in expressive role play and in verbal learning. Her ability to persist in an intellectually demanding activity is outstanding and this is associated, not at all paradoxically, with an intense dislike of being thwarted. On almost every single observation Sandra spends some time whining or protesting frustrations, and she is quite skilled at getting her own way.

Mrs. S should be characterized as a child-centered mother. During our observations she seemed always very readily accessible to the child in the sense of being able to leave whatever she was doing and spend time with Sandra if she wanted her to. Mrs. S characteristically adopts a non-directive approach in dealing with Sandra (especially so far as intellectual activities are concerned.) She is less apt to suggest activities than other "A" mothers, and more apt to merely observe Sandra (often with a wry and amused expression) as she busies herself on her little projects.

On the other hand, she is not the most successful of mothers in dealing with Sandra's whining or tantrums. Possibly as with many a mother of an obviously bright and determined little child, she is a little afraid of conflict with her, viewing her as she seems to, as a near-adult whose desires must be respected and given considerable weight.

Excerpt Number 1

In this observation Sandra is about thirteen and a half months old. It is lunchtime, and Sandra has been quite cranky, presumably because mother was late coming home and she was hungry. Mother, too, is not at her best, having just tried to deal unsuccessfully with one of Sandra's tantrums. The scene opens with Mother at the door, welcoming home Sandra's sister, while Sandra sits in her high chair at the kitchen table. Sandra, on her own and quieting down after her tantrum, launches into one of her little "scientific" experiments: her topic, the law of floating bodies. In this and the following excerpts, the times stated on the left are the number of minutes and seconds counting from the start of a 10-minute observation on the child. For example, 3:15 means 3 minutes and 15 seconds from the beginning of the observation.

3:15 Sandra reaches for a glass of milk on the table which is about one foot away.

3:20 Very carefully, Sandra slides the glass along the table top, apparently trying not to spill the milk. She spills only a little.

3:25 She sips the milk with a contented look.

3:30 She pushes the glass away, again sliding it along the table top.

3:40 Suddenly she drops a piece of meat into the glass and it sinks. She startles slightly and then deliberately puts a potato chip in and it floats. She looks puzzled.

4:00 Sandra puts her hand deep into the glass and seems to be searching for the piece of meat at the bottom.

4.15 Sandra lifts the glass toward her. Peers into it. Then pushes it away.

4.35 Sandra puts her hand in again and waves her fingers about in the milk several times as if trying to reach the meat.

4.50 Mother comes in with Sister. M: pretty good! (refering to the fact that Sandra had eaten some food), do you want a drink?

5.00 Mother holds glass for Sandra and she drinks.

5.20 As mother begins to take away the glass, Sandra starts to screech. M: Oh, you are naughty today! and goes to kitchen, leaving the glass on the table.

5.30 Sandra slides the glass over and drops a chip in, resuming her experiment. M returns, removes the glass well out of Sandra's reach, lifts her out of the chair, sits her on the floor, and leaves.

5.45 Sandra starts screaming and whimpering.

6.00 Mother comes in and wipes table, deliberately ignoring Sandra's tantrum which continues for four more minutes.

Commentary:

Sandra's experiment with flotation is a clear example of a "highly intellectual activity" for a child of this age. In this episode, Sandra's mother inadvertently cuts short this intellectual activity, thereby provoking a tantrum in Sandra. This behavior on the part of Sandra's mother is not particularly characteristic of her. Mrs. S is no more prone to restricting her one-year-old than the average mother of a one-year-old "A" child. She is much more likely to adopt a positive approach: a mixture of techniques to teach, facilitate, and observe her child's activities.

Some of the ingredients in this mixture are illustrated in the following excerpt:

Excerpt Number 2 In this excerpt Sandra is about 15-months-old. Once more, Sandra has been whining, this time because her mother refused to let her play with a pair of scissors. Mother has tried several distractions, and now starts to build a tower with blocks, an activity which from previous observations we know Sandra enjoys.

3.00 Mother builds a tower of three blocks. Sandra carefully puts on the fourth block. Mother says: "Hey, that's right, Sandra."

3.22 Sandra picks up the third one and drops the very top one. Mother says, "You dropped it."

3.28 Mother sits down on the bed and watches.

3.34 Sandra puts the one back on the top. Mother hands her another one.

3.40 Sandra looks at the three blocks on the tower.

3.46 Mother gives Sandra another block. Sandra puts it on top. Mother claps and says, "Hey! Sandra. Good."

3.49 Sandra says, "Dat." and laughs. Sandra takes the top two off and puts them on the floor.

4.04 Sandra puts the little one on top. Then puts the bigger one on top of the smaller one. Mother looks on.

4.19 The small one is pushed off on her leg. Sandra puts the big one on top. Then puts the little one on top. Then Sandra says, "Mama, Mama."

4.27 Mother says, "I see."

4.30 Mother smiles. Sandra drops the top two off and puts them on again.

4.45 Sandra drops the smallest one behind the tower. Sandra crawls around the tower to get it.

4.51 Sandra stands up and picks it up and puts it on the top.

5.00 Sandra takes up the two blocks and walks across to Mother. Sandra walks by Mother and goes to the small table.

5.10 Sandra sneezes and puts the blocks down on the chair.

5.13 Sandra picks up the other block and says, "Down." Sandra walks to tower, almost trips on the teapot. Mother looks on. Sandra goes to put the block on the tower.

5.22 Mother removes the teapot so Sandra won't trip on it.

5.30 Sandra goes to pick up the bigger one and puts it over the small one so the small one is hiding under the big one. Now Sandra moves the big one and puts the bigger one on the table. Mother looks on.

5.45 Mother picks up the little one. She says, "Go," and puts the little one on the table, too. Now Sandra goes after the second biggest one and puts it on the table, over a green cup, so it covers the cup completely.

6.00 Sandra goes to pick up the biggest one, but her attention is drawn to the street outside and she runs to the window. Garbagemen are collecting garbage, and there is much clanging and banging of cans.

Commentary:

This excerpt may seem rather long and repetitious. The point of including it, however, is to show Sandra's outstanding ability to persist at a task, and her mother's use of a variety of techniques which maintain the child's attention without being overly intrusive. At the beginning, Mrs. S introduces the blocks to distract Sandra from play with the scissors; she makes the task interesting by showing what a tower of blocks looks like rather than merely suggesting that Sandra build one. Then, as soon as Sandra's interest is awakened, she reinforces it by immediately praising the child's efforts. Once Sandra's interest seems self-sustaining, Mrs. S assumes a less active role, observing Sandra's efforts, assuring her of mother's continued interest in what she is doing, supplying her with blocks when needed, removing obstacles from her path, and finally, permitting her to cease this activity when, after a prolonged stint, her attention turns to something equally captivating -- the garbagemen clanging cans on the street.

Excerpt Number 3 This excerpt comes from our second observation period when Sandra is close to nineteen-months-old. True to form, Sandra has just had a small tantrum because her mother stopped her from playing with a chain of safety pins which she had found. Mother now takes her into the playroom and distracts her with a safe substitute, a toy necklace and a barrette which Mrs. S pins in Sandra's hair. This distraction, presumably intended by her mother to initiate a "dress-up" sequence, turns into another of the little "scientific" experiments which this little girl loves. Her topics this time are "reflections" and "gravity."

6.00 Mother clips a small barrette on Sandra's hair. Mother: "You can see it in the mirror (there is a full length mirror on the wall a few feet away.)" Sandra looks around puzzled. Mother repeats: "Look in the mirror!"

6.20 Sandra moves toward the mirror and Mother points to the barrette in her hair as Sandra looks in the mirror.

6.30 Mother: "You have to get near to see it," and leads her nearer to the mirror. Mother "See your barrette? See it?" Sandra pulls at her hair and at the clip. She still seems puzzled. It seems as if she can't reconcile the feel of the barrette in one location (her hair which her hand is touching), and seeing it in front of her in another position.

6.45 Mother fixes the barrette in her hair and says: "You are not watching. Look there!" Mother points to the reflection in the mirror, and Sandra stares, still pulling at her hair, with a puzzled expression. Mother asks Sandra's one-year-old playmate, Tom, if he wants a barrette, too.

7.00 Sandra holds out her hand, gesturing for the can full of barrettes and little objects which her Mother has taken down. Mother gives her the can and Sandra takes out a barrette.

7.15 Sandra takes the barrette to her friend and tries to clip it in his hair. She doesn't know how to do this and simply places it on his hair and it falls.

7.30 Mother observes, and says: "Here's a nice one to put on his hair." Mother slowly clips one on the boy's hair, demonstrating to Sandra how it works. Sandra looks on. Mother leaves the room.

8.00 Sandra tries to clip the barrette on her friend's hair, moving the clip a little, but it again falls off.

8.15 Sandra puts several clips back into the can, one-by-one.

8.30 She puts the cover on the can and screws it slightly. She takes off the necklace from around her neck.

8.45 Sandra puts a barrette on her hair, again not clipping it but placing it on her hair and it falls off.

9.00 She repeats this action two or three times.

9.20 She turns her attention to taking the small barrettes and ornaments one-by-one from the can and putting them back in, examining each carefully, apparently still trying to understand how their clips work.

9.55 Sandra covers the can and screws on the top (she continues with her exploration for several minutes after the end of this observation).

Commentary:

This episode is remarkable again for the topic of the child's interest, and also for the length of time she persists at the task of understanding first how an object in one place can be reflected in another, and second, how mechanisms operate to keep things from falling. In this episode, her Mother takes a more assertive and directive approach, which actually doesn't work particularly well since the child obviously did not seem to learn much about reflection or how to operate the clip from her mother's efforts. Nevertheless, by supplying the materials for the experiment (mirror and barrette), and showing enthusiastic interest, Sandra's mother has at least posed the question for Sandra, and she continues to grapple with it long after the Mother quits the scene.

Excerpt Number 4 This final excerpt comes from an observation when Sandra was twenty-one-months-old. It provides a beautiful example of a "highly intellectual" activity involving verbal learning for Sandra and a mixture of direct teaching and active participation on the part of her mother and sister. It is again remarkable for the length of time that Sandra sustains interest in the task and the mother's enthusiastic approach.

5.25 Sandra takes out a plastic animal from a box and makes a noise.

5.29 Mother says: "Neigh, neigh--that's a horse." Sandra: "Horse." Mother looks on as Sandra labels and makes "moo" noise.

5.40 Sandra drops horse on the table and tries to reach for Mother's address file.

5.45 Mother: "No, no, you can't play with mommy's card. Find more animals. Find the cow."

5.50 Sandra looks through the box.

6.00 Sandra takes out another animal and makes "moo-moo."

6.16 Mother: "You found it!" Sandra: "Moo." Mother: "Moo." They laugh. Mother and sib label for Sandra -- "Cow."

6.32 Mother: Can you stand it up?" Sandra complies.

6.37 Mother suggests Sandra go find more animals. Sandra goes back to the box.

6.44 Sandra takes out another one and says, "Neigh, neigh." Mother: "Yes, that's another horse."

7.00 Sib: "Black one." Mother: "Yes, that's a big black one." Sandra: Black." Mother: "Yes, black horse."

7.08 Mother suggests dog. Sandra: "No," but Sandra goes to find it.

7.34 Mother: "No doggie? Look some more." Sib offers to help.

7.41 Sandra looks on as Sib rummages through the box.

7.50 Sandra glances at the rain and snow outside.

7.57 Sib hands Sandra another cow. Sandra looks at it. Sandra stands it on the table and says, "Moo."

8.13 Sandra looks on and waits. Mother also helps looking for the dog.

8.34 Mother shows Sandra another animal -- "What's that, Sandra?" Sandra: "Mew, mew." Mother: "What does a dog say?" Sib: "That's a dog."

8.46 Mother: "Yes." Sandra looks on as Mother rummages and takes out another animal and makes roaring noise. Sandra: "Lion!" Mother: "That's right. That's a lion."

9:05 Mother: "Here's another one," and puts a calf on the table. Sandra looks on and then makes "Moo-Moo."

9:18 Mother smiles as Sandra says "Moo-cow, Moo-cow!" in excitement.

9:22 Sandra looks at the lion and makes roaring noise.

9:30 Mother looks through box and takes out another animal. Sandra: "Baa-baa" noise at the lamb.

9:39 Mother looks on as Sandra makes "baa" then roaring noise at the lion.

9:42 Mother: "That's a lion," and makes roaring noise also. Sandra joins in. Mother: "That's right." Sandra makes "baa" noise.

9:52 Mother: "Which one says baa?" Sandra looks. Mother: "This one," and points. Mother and Sandra make "baa" noise. Sandra picks it up as Mother looks on.

We have now completed our picture of Sandra, a one-year-old "A" child from Class II background. Sandra is clearly an exceptional child. Are her talents mostly innate and their development intrinsically determined? Would they have bloomed so early or so luxuriantly in another environment? These questions are obviously unanswerable with respect to any particular child. In Sandra's case, as is often the case with most children from advantaged backgrounds, there are many things promoting her development simultaneously: her parents are highly intelligent and well-educated, her material environment is rich and exceptionally well-designed from a child's point of view; her mother has the time and willingly spends it participating with her in intellectually promising activities; and her mother is knowledgeable enough and observant enough of her to be able to use those techniques of interaction which generally promote her intellectual and social development. It is impossible to point to any one of these factors as the determinant of Sandra's excellent development; they all enter into her experience which, in turn, fundamentally molds her development. This happy coincidence of inherited abilities and a superior human and physical environment is not common in children from other socio-economic backgrounds; a case in point is presented in our next case history.

Cathy: a one-year-old "C" girl

Our next subject is Cathy. Like Sandra, Cathy was just one-year-old when we first started observing her. Cathy is the youngest child in a family of thirteen children ranging in age from one to nineteen years. Her mother is in her early forties and her father in his early fifties. Cathy is an appealing little girl who, at the beginning of our observations, was very advanced (her Bayley IQ was 134, higher than that of most of our A children). She was able to walk, run, and climb with relative ease, showed little shyness of strangers, and was socially very competent, especially in dealing with other children. Nevertheless, we predicted that Cathy would eventually become a C child. She would fail to realize her obvious intellectual potential, primarily because her environment would not provide her with the necessary intellectual focus and sustained stimulation. We made this prediction on the basis of the school records of her numerous siblings and our own observation of those closest in age to Cathy who were not yet in school. They seemed lethargic, totally uninterested in intellectual pursuits, and performed below average intellectually.

Cathy's Background: Physical Environment

When we first started observing Cathy the family lived in a deteriorated, sparsely furnished seven-room house in a residential area of

Greater Boston. Their house is situated on a dead-end street and is flanked by other small houses in mixed states of repair. Half a block away is a main street with somewhat more substantial houses, but the general impression is of a lower middle-class area with families struggling to maintain a respectable appearance. The children on the block play in their small back yards and on the dead-end street in front.

Curiously, as was the case for Sandra, our one-year-old A, the family's living situation changed substantially during the course of our study. Sometime after the end of our second series of observations on Cathy, three bedrooms and one and a half baths were added to the house to alleviate the space problem. Despite these additions, Cathy still has to share a room, aptly termed a "dormitory" by the family, with four other siblings. Also, since this change did not take place till after Cathy was 21 months old, all of the observations to be discussed in this case study took place when living quarters for the family were extremely cramped. At that time, the house consisted of one floor with two bedrooms and the "dormitory," a bedroom in the attic and one in the cellar, a kitchen and a living room. All the bedrooms save the dormitory were off limits to Cathy and she spent most of her time near the large central table in the kitchen, the television set in the living room, and the dead-end street in front of the house where the family frequently congregated for entertainment and socializing.

Human Environment

In terms of income, residence, and education, Cathy's family must be classified in Class IV. Her father worked at a semi-skilled building maintenance job, and their income, for a family of fifteen people, was about $8,000 per year. Neither parent has more than a high school education but interestingly, their oldest child is now attending a state college, and Mrs. C has recently started art lessons. The parents and children are all Catholics and their ethnic background Southern European. The people with whom Cathy spends most time are her siblings, particularly her four-year-old sister, a teenage sister, and a pre-teenage brother under whose supervision she is frequently left as her mother busies herself with the household chores.

During all our observations, Cathy was nominally in her mother's charge, but with brothers and sisters very often around, more than half of her interaction took place with them.

Observations on Cathy

As we have previously noted, Cathy is a gifted one-year-old (so far as test scores are concerned) who we predict will not realize her intellectual potential because of a lack of intellectual stimulation at home. So the first question is what does her environment, intellectually-speaking, look like?

First, let us examine some statistics. Table V-1 shows that when Cathy was 12-15 months old, her mother typically spent about 11 minutes out of an observation hour interacting with her in some way, about 1 minute engaging with her in "highly intellectual activities" such as teaching her how to perform a household chore, and almost no time in direct teaching, and about 1 minute restricting her activities. Over this three-month period, Mrs. C encouraged five times as many of Cathy's activities as she discouraged, initiated half as many activities for Cathy as Cathy herself initiated, and was successful in the vast majority of her attempts at controlling her.

In the second observational period, when Cathy was 18-21 months old, her mother spent, on the average, 14 minutes out of an observation hour interacting with her in some fashion, about 2 minutes engaging in "highly intellectual" activities, about 1 minute in direct teaching, and about 2 minutes restricting her activities. Over this span of three months, Mrs.C encouraged five times as many of Cathy's activities as she discouraged, initiated half as many activities as Cathy initiated for herself, and was successful in the overwhelming majority of her attempts at controlling her daughter.

From these numbers we get a picture of Mrs. C as a mother who has changed very little her style of interacting with her one-year-old during a period of her child's life when development is extremely rapid. Both at 12-15 months and at 18-21 months, Mrs. C spends no more than four minutes out of an observation hour engaging with Cathy in activities which could be construed as intellectually promising, and no more than a minute or two teaching her. The major reason for this may very well be that with a large family to look after, Mrs. C is a very busy woman and it is a rare occasion that she literally has the time to devote undivided attention to her one-year-old. This situation would not be detrimental if Cathy got the intellectual stimulation she needed from her brothers and sisters. However, as Table V-2 shows, Cathy engages in few intellectually stimulating activities with her siblings and apparently they never teach her.

On the other hand, we should note that a truly outstanding feature about Mrs. C's home is the atmosphere of cheerfulness and sociability. Mrs. C seldom seemed to raise her voice at the children, managed the home with efficiency, and demonstrated much love, patience, and good humor toward her family. Also, we observed very little fighting and squabbling

Table V-2. Number of Minutes per Observation Hour Spent by Children of the Case Studies in Various Types of Interaction with All People

	Case Study A's[a]				Case Study C's[b]			
	12-15	18-21	24-27	30-33	12-15	18-21	24-27	30-33
Total interaction time	31.8	19.8	22.2	16.4	19.8	18.0	20.4	15.0
Highly intellectual activities	6.1	3.8	4.1	2.7	2.2	2.6	1.2	1.6
Teaching	1.9	2.2	1.7	1.1	0.2	1.0	0.0	0.4
Restriction	4.1	2.2	2.2	3.2	2.7	2.4	4.7	4.3
Other encourages	21.5	11.5	13.1	10.4	14.0	9.6	13.5	8.4
Other discourages	7.6	2.8	2.2	3.5	2.8	2.4	4.6	4.8
Other initiates	16.0	8.5	6.6	3.4	8.0	11.2	10.6	7.8
Subject initiates	15.9	10.9	11.3	9.9	11.0	6.6	9.7	7.2
Other successful in control	5.2	2.4	3.0	3.3	2.8	2.8	3.7	3.5
Other unsuccessful in control	2.0	2.1	1.4	0.8	0.7	1.1	1.2	1.7

[a] Sandra at 12-15 and 18-21 months; Nancy at 24-27 and 30-33 months.

[b] Cathy at 12-15 and 18-21 months; Robert at 24-27 and 30-33 months.

among the children and, like their mother, older brothers and sisters showed a great deal of patience and affection toward Cathy. Cathy's mother and mother-surrogates must be characterized as positive and loving towards her, but intellectual stimulation of this one-year-old is not at the top of their list of priorities.

It is time now to present some excerpts from our actual observations on Cathy. It will be no surprise to find that a major point of contrast between Cathy and Sandra will be the materials that the two children play with. Sandra, you will remember, was among the most fortunate of our Subjects in the number of well-designed toys she possessed. Cathy, in contrast, has far fewer than the average number of toys. We noticed her playing with a balloon, a party noise-maker, a hand-me-down robot, and a rocking horse, whereas Sandra had so many toys it would have taken several paragraphs to list them all. In comparison to Sandra, we are far more likely to find Cathy playing with household objects, such as juice cans, sponges, and wastebaskets than toys, and the "intellectual activities" she experiences usually concern learning how to carry our household chores.

Excerpt Number 1

4.00 Cathy falls at the doorway to the living room. She picks herself up and cries.

4.07 Mother turns around and asks, "What's the matter? What happened? (Cathy walks to Mother.) Did you fall?"

4.15 Mother bends down to hug Cathy, saying, "Okay, Okay. You want the kleenex?"

4.26 Mother hands Cathy a wet paper towel. Cathy takes it and starts to wipe the kitchen table.

4.31 Mother looks on and says, "Clean, clean."

4.33 Mother goes back to work at the sink. Cathy walks around the table, wiping it with short motions.

4.45 Cathy takes the wet towel to living room and goes to clean the chair, then the cabinet.

5.00 Cathy cleans the couch with the wet towel, then the chair on which a brother is sitting watching Sesame Street. Cathy goes to a sister and wipes her chair, then Cathy wipes the couch again.

5.20 Cathy walks to kitchen and goes to wipe the high chair near the doorway.

5.35 Cathy goes to wipe the ice box.

5.43 Mother looks at Cathy and smiles. Cathy smiles and keeps on wiping.

5.53 Mother leaves. Mother comes back.

6.03 Mother looks at Cathy, saying, "clean, clean, clean!" Mother walks to the hall.

6.10 Cathy walks around, wiping the stove, then the ice box again, then goes to wipe the T.V. screen in living room.

6.32 Cathy goes to wipe the chest of drawers.

6.40 She then wipes the window sill, then the chair.

7.00 Then she wipes the couch again.

7.15 Cathy goes to wipe her brother's chair, then walks to kitchen.

7.19 Cathy makes an "eh eh" sound. Mother is cutting some bread at the stove and looks at Cathy.

7.27 Cathy goes to wipe the stove with the wet towel.

7.36 Mother says, "It is clean, that's good."

7.39 Mother resumes cutting bread. Cathy walks back to the living room.

7.45 Cathy wipes the T.V. screen again.

8.00 Cathy walks around in living room and wipes the furniture in there.

8.28 She walks to kitchen, then down the hallway to the dormitory where Mother is putting some clothes away in the drawers.

8.40 Cathy goes to Mother and babbles.

8.52 Mother looks up and asks, "What do you want?"

9.00 Cathy wipes the drawers.

9.04 Mother puts clothes away and then tidies up the beds. Cathy smiles at observer and wipes the dresser. She babbles to herself.

9.30 Cathy continues wiping with the wet towel and babbling to herself. Mother is tidying up at the other end of the room. Cathy kneels on the floor and wipes the dresser. Mother walks by Cathy.

9.58 Mother glances at Cathy, then walks out of the room. Cathy stays in the dormitory.

Commentary:

This excerpt of Cathy's activities should be compared to excerpt Number 1 of Sandra. Both excerpts come from observations when the Subjects are approximately 13 1/2 months-old. They are similar in that the child's activities are to a large extent self-initiated and self-directed with minimal input from mother or other people. Cathy's excerpt shows Mrs. C in a characteristic light. She is ready to comfort Cathy when she falls, and skillful at distracting her from preoccupation with her hurt to a constructive activity (contrast MRS. S's less adept handling of Sandra's tantrums). Even with regard to intellectual stimulation, Mrs. C's behavior seems very well adapted to Cathy's activity. She lets her get on with the task of learning, yet helps to sustain her interest by appropriate words of encouragement and praise as she busies herself with household chores similar to those which Cathy is undertaking. The problem for Cathy is that she experiences so few interactions of this type. Much more typical are the experiences exemplified in the next excerpt.

Excerpt Number 2: In this excerpt Cathy is in the living room. The drapes to the front windows are drawn although it is full daylight and the room is dark and very sparsely furnished. Her youngest sister, Sylvia (just over two years old) is in the living room playing with a ball.

0.00 Cathy gets onto rocking chair. Sister Sylvia (2 1/2 years old) throws ball at her. Cathy tries to get it (after it had landed on a chair.)

0.20 Cathy gets down from rocking chair. Puts out her arms as if to catch the ball. Sister picks up ball from chair and throws it, hitting Cathy lightly on face.

0.35 Cathy smiles and runs to window.

0.45 Cathy makes a noise. "Ca-aaa, Caaa."

1.00 Wanders to couch.

1.10 Wanders to door of living room.

1.20 Wanders around living room not looking at anything in particular.

1.45 Touches stroller near doorway to kitchen. Pushes it along from side. Another sister, Mary (3 years old) comes in. Takes ball from younger sister, Sylvia.

2.00 Cathy climbs on couch and looks at sisters.

2.15 Mother comes in to arbitrate dispute between sisters. Takes Mary out into kitchen.

2.45 Cathy follows. Sits on floor.

3.00 Cathy looks around as Mother busies herself at counter.

3.30 She climbs onto chair near large table.

3.40 Mother bends over and ties shoes. Mother: "OK?" and moves off.

4.00 Mother: "You want to play ball? What are they doing (pointing to sibs)? They play ball.(said in a didactic tone). Cathy laughs.

4.15 Cathy walks to living room, then crawls on floor.

4.30 Crawls to sibs who are sitting on floor rolling ball to and fro between them.

4.50 Crawls to sibs, gets in way. Mary lifts her up from floor and gives her a plastic statue and says, "Play with the dolly," pushing her gently over to window-side.

5.15 Cathy examines statue. Pushes it against chair (as if testing its resilience).

5.30 Kisses statue. Walks over to sisters and then gets in way. They say nothing.

5.40 Cathy continues over to couch. Then walks back.

6.00 She goes to window and looks out, moving the drapes aside (the drapes are all drawn and the living room quite dark though it is full daylight.)

Cathy looks out (there is nothing much to see as the window faces a dead end street).

6.30 She walks back and gets in way of sisters' ball game.

6.35 She goes over to couch, then to sisters, looking at them.

6.45 Cathy goes to Sylvia, is in the way of the game. Sylvia: "Get out of the way!" Cathy moves off.

7.00 Cathy goes to window. Pushes plastic statue against chair.

7.15 Crawls about on the floor.

7.45 Again gets in way of her sisters. Sylvia pushes her firmly, but gently to kitchen.

8.00 Cathy crawls under telephone table. Takes up transparent ball from floor.

8.30 Goes to living room entrance which is blocked by sister. Moves back into kitchen. Picks up a baseball mitt from floor. Lets it drop. Doesn't observe it.

8.45 Wanders about kitchen. Goes to mother in living room. Says something, showing her the ball.

9.00 Mother: "What you got?" "A ball?" Mother's attention immediately turns to sibs. She shows them how to play with ball. Cathy looks ahead blankly.

9.10 Cathy comes over to stroller--babbling. Touches stroller.

9.35 Wanders over to couch; looking at nothing in particular.

9.40 Mother leaves the living room.

9.45 Cathy crawls around in living room, as sisters continue with their game.

Commentary:

In this excerpt, we observe Cathy mostly wandering on the periphery of others' activities. Interaction with her mother consists of mother tying her shoes, two brief checks on what she is doing, and a very brief attempt to instruct. Throughout the episode, her sisters are intent on keeping her out of their game; each time she interrupts, they gently but firmly get her out of the way. Moreover, the physical environment is so monotonous, that Cathy finds little to do on her own apart from pushing the stroller, exploring the rigid outlines of the statue, and looking out of the window at a dead end street. It takes little imagination to see the contrast between this and Sandra's excerpt Number 2, in which Sandra receives her mother's undivided attention as she learns to build a tower of blocks, and leaves this activity only to observe the equally exciting spectacle of garbage men emptying huge cans into the enormous mouth of a garbage truck.

Excerpt Number 3: The next excerpt from Cathy's observations provides a sharp contrast to Sandra's excerpt Number three. Both observations were done when the children were 18-19 months-old. In this excerpt, Cathy had found a paper bag full of sea shells which her brother had collected and brings them to her mother:

1.00 Cathy pulls down a paper bag from the bureau in the dormitory.

1.20 Cathy opens it, looks into it, then rolls up the top, closing it.

1.30 Cathy shakes the bag and smiles at the clatter inside it. She goes to the kitchen.

1.45 Says something to her mother. Mother: "What? What you got? What is it?"

2.00 Cathy says something (indistinct). Mother: "Are they Johnny's?" Cathy: "I want...." Cathy runsin a circle shaking the bag and obviously enjoying the clatter.

2.15 She shakes the bag. Mother busies herself at the stove. Cathy babbles. Mother: "What?"

2.30 Cathy takes one or two shells out and throws them on the floor. Mother: "Those are shells."

2.35 Cathy sits on the floor and takes out one shell after another, throw--ing them on the floor. Mother is busy and doesn't observe.

3.00 Mother suddenly notices and says: "Don't throw them down there! Put them in here." Mother bends over Cathy and shows her how to put the shells in the bag (Cathy obviously knows how to do this and Mother's purpose seems to be to persuade her to do it rather than teach her).

3.15 "Put them back in. There's another one, right here (pointing)." Cathy: "Another one." Mother: "Yes, another one." Mother moves off. Mother leaves the room.

3.30 Cathy puts the shells one by one in the bag.

4.00 Cathy takes the shells out of the bag one-by-one, putting them on the floor.

4.30 Cathy places the shells one-by-one on the seat of a chair which is next to her.

4.55 Cathy stacks one shell on another like two saucers.

5.00 She continues placing the shells on the chair, putting them on the floor, then putting them on the chair again. She handles the shells one-by-one.

6.00 She stacks some shells, one-by-one, like saucers on the floor (about six or seven in all).

6.45 Mother returns. Cathy holds out the stack of shells to her mother (holding the stack by the bottom shell quite carefully). Mother says, "Put them back, quick! Put the rest back in. You got one on the floor." Mother goes to the stove. Cathy puts a handful of shells (from the stack which has now disintegrated) into the bag.

7.00 Cathy puts a few more shells into the bag, one-by-one, and squeezes together the mouth of the bag.

7.15 She looks around the floor obviously searching to see if any are left. She gets up holding the bag and walks to Mother. Mother: "Have you got them all?" Mother glances around at the floor, satisfying herself that there are no shells remaining there.

Commentary:

Perhaps the major point of contrast between the excerpts from Sandra and Cathy is in the mother's awareness of what the activity in question means to the child, what she might be learning from it. Sandra's mother makes a deliberate attempt to teach Sandra the concept of "reflection" with the mirror and is not conspicuously successful in doing so. But she poses the problem for Sandra and thereby sets off a train of exploration which, in a child as bright as Sandra, will very likely culminate soon in a rudimentary understanding of the concept. To use terms from Piaget's writing (1952), Sandra's mother pushes the child from assimilation to the brink of accomodation. In contrast, Cathy's mother seems to be unaware of the intellectual significance of Cathy's stacking the shells. We view this as a "highly intellectual" activity, which provides an opportunity for the child to learn spatial relationships, but clearly, Mrs. C is only concerned with the housekeeping aspect--that the child should not clutter the floor or damage her brother's possessions. In a large family and small space, it is probably necessary to enforce rules of possession, but a price is paid, perhaps unwillingly, as this excerpt illustrates.

Excerpt Number 4 Our final excerpt comes from an observation when Cathy was 21 months old. It should be contrasted with Sandra's Excerpt Number 4 taken when Sandra was at a similar age. The activities described in both excerpts deal with the learning of names for things. Cathy's mother is more attentive to Cathy than is typical for her, yet there is a considerable contrast between her and Mrs. S in both quantity and quality of interaction with their one-year-olds.

Mother has been feeding Cathy a bowl of noodles and prepares to clean up Cathy's messy face and hands.

6.00 Mother: "How about your face?" Mother wipes Cathy's hands with a wet towel. Cathy says something. Mother: "You want to hold it?" Mother gives Cathy the folded wet towel. Mother: "Wipe your face."

6.20 Cathy takes the towel and rubs her mouth. She opens up the towel and puts it on the tray.

6.25 Cathy: "Clean." Mother: "That's right, clean." Cathy: "Fold it," as she rolls the towel up, putting one end over toward the middle and pushing at the bulky end. Mother: "Fold it."

6.40 Mother goes back to the sink and starts doing the dishes. Cathy straightens out the towel on the tray by pulling at the edge nearest her, then crumples it up, squeezing it in the middle.

7.00 Cathy wipes her mouth with the towel. She babbles as she hangs the towel over the side of the high chair, holding it by one end.

7.20 Mother: "Wait a minute (apparently thinking Cathy wants to get out of the chair)." Cathy puts towel over her face.

7.30 Mother: "Do you want to get down?" Cathy says nothing and Mother lifts her out.

7.40 Cathy: "Water." Mother: "Do you want water on this (the towel) to get it clean?"

7.55 Mother gives Cathy the wet towel (without wetting it any more), saying: "What are you going to clean?"

8.00 Cathy: "Face." Mother: "You are going to clean up your face?" Cathy puts the towel over her face.

8.20 Mother watches her.

8.30 Cathy: "Wash face." Mother: "You are washing your face." Mother goes back to the sink. Cathy wipes the table with the towel, then her cheek.

8.50 Cathy blows her nose in the towel, and follows Mother to the door in the kitchen which opens to the back yard.

9.00 Cathy follows Mother back into the kitchen. She wipes her face. Goes into the living room. Wipes her hand, wipes her nose.

9.45 She stands staring into space, holding the towel.

Commentary:

Cathy's mother is usually at her "best" when she is interacting with Cathy in the context of some household chore or basic care activity--in this example, cleaning her up after a meal. It is on these occasions that Mrs. C usually finds the time to instruct Cathy either in attaining some practical skill or the names for things, and Mrs. C does both things in this example. Nevertheless, Mrs. S's interaction may be contrasted with Mrs. C's in the length of time she engages in teaching Sandra and the quality of excitement she imparts to the task as she dramatizes the animal sounds. It is true that Mrs. C provides feedback to Cathy that her labels are correct ("clean," "fold it," and in: Cathy: "Wash face," Mother: "You are washing your face,") but the teaching aspect simply does not go very far. For Mrs. C could have made a dramatic game out of washing different parts of the body reminiscent of the nursery rhyme: "This is the way we wash our face," etc., but she doesn't do so. She picks up on the child's cues only and goes only so far as the child's limited language and imagination demands.

We have now completed our study of Cathy, a one-year-old girl who we predicted will become an intellectually average child. Our tests demonstrate that Cathy is now performing well above average, but our detailed observations suggest that she may fail to realize her potential because of an inadequate environment. In Cathy's case, there seem to be several factors simultaneously inhibiting her development; her mother's lack of time for her one-year-old in the face of enormous family responsibilities; her family's unawareness of the significance of certain intellectual activities for Cathy's intellectual development; the relative poverty of her material environment; and the need for rules restricting her access to places and things. On the other hand, Cathy is luckier than most children in having a family whose relationship with her, considered from a social and emotional point of view, is generally very good.

It may be that the counterbalancing good socio-emotional milieu of Cathy's home will offset the relative lack of intellectual stimulation we observed in her second year of life, and that our prediction for Cathy's intellectual development will not be confirmed. Several remarkable changes in Cathy's home situation during her third year of life point to this as a possibility. First, the family's economic situation has improved considerably. Her father now has a better paying job, an older brother has started work and contributes regularly to the family income, and the house has been greatly expanded and redecorated. Second, Cathy's two sisters closest to her in age are now in Head Start classes, and not only are their teachers' reports of their intellectual progress good, but the "spill-over" to Cathy is tangible. They are now more likely to engage in "intellectual activities" at home and to involve their little sister in singing nursery rhymes, playing school, and the like. Most important, with the improvement in their economic and physical circumstances and having fewer children to attend to at home, Cathy's mother now has more time to devote to her own intellectual development as well as to Cathy's. This mother of thirteen children is now taking art lessons and is producing delightful oil paintings of which her family is very proud. Asked what she "gets out of the lessons," Mrs. C replied "two hours of rest!" In view of the striking changes that have taken place since this case history was written, we may eventually well be in the happy situation of having our original prediction for Cathy's intellectual development disconfirmed. The story of Cathy will be continued in a later publication.

Nancy, a Two-Year-Old "A" Girl

A child can develop superbly under crowded house conditions and without well-designed toys if he is permitted a certain amount of freedom to move about and explore and has access to interesting household and natural objects. Similarly, his mother need not be highly educated nor well-off financially in order to use the time she spends with him interacting in intellectually and socially profitable ways; or to organize his routine so that a varied and stimulating range of activities is regularly included in his experience; or to make herself aware of his rate and stage of development and the effects of the child's home environment on his development. An example illustrating these points is given in the story of Nancy. Nancy is the youngest child in a family of six children, four boys and two girls, ranging in age from one to eight years. Her mother and father are both in their late twenties. We predicted Nancy would develop very well intellectually and socially, on the basis of the outstanding achievements of her older siblings. This prediction is being confirmed by Nancy's test scores on all intellectual tests, and especially those of abstract ability and sense discrimination. Nancy performed in the top third of all children on these tests every time she was tested.

Nancy's background: Physical Environment

Nancy's family lives in an eight-room single family house in a deteriorating residential area of Greater Boston. Their house is situated on a dead-end street and is flanked by other single family houses which, like their own, are in fair to poor states of repair. The children on the block play in the pocket size backyards and in the dead-end street in front. A few blocks away is a mixed commercial-residential area with small stores and considerable traffic.

There are eight rooms to eight people in Nancy's home. The rooms include a small front parlor, a living room, dining area, kitchen, two baths and four bedrooms. Nancy shares her bedroom with her only sister. The front parlor and parents' bedroom are off limits to Nancy except under supervision, but her mother stressed that she is not scolded for breaking these rules, just reminded of them.

Human Environment

With respect to income, residence and education, Nancy's family falls in Class III. Both her mother and father have had a year or two of training in vocational school, and her father works as a technician in a research operation. Previous to her marriage, her mother also held a technical job in a laboratory. Their classification as Class III rests mainly on their income which is between $7,000 and $12,000 for a family of eight, and their residence, which we have already described.

All our observations were done when Nancy was in her mother's charge. Most of Nancy's interaction with people is with her mother, but with a three-year-old brother nearly always around, and other siblings sometimes at home, about one-third of Nancy's interaction is with them. It is important to note that the quality of Nancy's interaction with her siblings is exceptional and must be in part due to Mrs. N's expertise in handling her large family. We observed very little fighting or squabbling among the children, a great deal of joint participation in activities, and a large amount of help and instruction being given by older siblings to younger. Nancy is one of the few children whose interaction scores on such things as teaching and engaging in highly intellectual activities are significantly increased when we count interactions with all people, including siblings, and not just the mother. Mrs. N is very skilled at organizing interesting activities for her brood. Often these took the form of practical projects to please specific people, such as making Christmas gifts, or creating posters and banners to welcome home a brother who had had his tonsils out, or making a cake and cookies. Consistent with her interest in having the children be active participators, she is one of the few working-class mothers who turned on the television only for selected programs like Sesame Street, often sat and watched the program with her children, and discussed the program with them while it was on or after.

Observations on Nancy:

Table V-1 shows that when Nancy was 24-27 months old, her mother typically spent about 17 minutes out of an observation hour interacting with her in some way, about 3 minutes engaging in highly intellectual activities, about 1 minute in direct teaching, and about 1 minute restricting Nancy's activities. Over this three-month period, Mrs. N encouraged ten times more of Nancy's activities than she discouraged; initiated twice as many of Nancy's activities as Nancy herself initiated, and was successful in half of her attempts to control Nancy.

The remainder of this case study will be devoted to providing verbatim excerpts and interpretations of our actual observations on Nancy when she was 24-27 months old. The picture we shall see is of a more mature version of our "A" one-year-old, Sandra. Like Sandra, Nancy enjoys activities involving fine motor activity, and, in a development to be expected for her age, she sometimes uses these in an original fashion. Her persistence at a task is similar to that of Sandra, but in her case there is not the infantile tendency to give way to tantrums when thwarted.

Excerpt Number 1 When this observation was made Nancy was just over 25 months. The situation is a familiar one to observers of two-year-olds. Mother is changing Nancy after she has had an "accident."

2.00 Mother rubs salve on Nancy's behind. Mother: "You've got a spot. There, you're all set. Do you want to put your pants on?"

2.10 Nancy picks up her pants and puts leg in. "I can do it." Mother: I know, I'll watch you."

2.28 Nancy gets other leg in. Mother helps Nancy. Mother: "Okay?" Nancy: "I know how to do it." Mother: "I know you know how to do it."

2.45 Nancy struggles to lift pants over her behind. Mother gestures, offering help. Nancy struggles silently. Mother: "Do you want help?"

3.00 Mother: "Your nose is running, too. You're running from both ends!" Mother wipes her nose as Nancy struggles with pants. Mother: "They're hard." Nancy pulls at pants. Mother watches.

3.34 Mother offers help. Nancy: "Yes." Mother pulls pants up. Mother: "Oh, boy! That's a hard job."

3.50 Mother holds Nancy's outer pants and helps her into these. Mother: "One foot, then the other foot." Nancy almost falls. Mother: "Careful!"

4.00 Mother tucks in Nancy's shirt. Mother: "Sit down, I'll get your shoes on." Nancy sits. Nancy: "On floor?" Mother: "Yes, right on the floor."

4.10 Mother puts Nancy's socks on. Nancy tries to put her shoe on. Mother: "That goes on your other foot." Nancy: "This one." Mother: "Other foot."

4.30 Nancy pulls shoe off. Nancy: "I can get it." Mother watches Nancy put shoes on. Nancy holds laces.

4.55 Nancy: "Is this the other one?" Mother: "Yes, that's the other one (foot)."

5.00 Mother: "What a big girl!" Mother: "Can I help you tie them?" Nancy: "Okay." Mother: "You watch Mommy." Mother ties shoes quickly (not really demonstrating how to tie). Mother: "Okay." Mother ties other shoe. Mother: "All done."

Commentary:

The excerpt describes a basic care activity which all mothers have to perform several times a day. Mrs. N is very skillful here in allowing her two-year-old to master the skill of dressing herself, in recognizing and praising her accomplishments ("I know you know how to do it"; "That's a hard job!"), in offering and giving help, and in using the opportunity to teach ("Your nose is running, too. You are running at both ends." Nancy: "Is this the other foot." Mother: "That's the other one.)

Excerpt Number 2 When this observation was taken, Nancy was just over 27 months. She is playing with play dough with her three-and-a-half-year-old brother, Richard, a type of activity which Mrs. N often encourages. Mother sits nearby with a cup of coffee reading a paper and observing the children frequently.

3.00 Nancy watches Richard who is using an inverted measuring cup on his play dough.

3.10 Watches Richard, eats cookie. Richard takes measuring cup from play dough. Nancy: "You make a hat?: (Richard's cup on the dough looks like classic straw hat).

3.21 He doesn't answer.

3.31 Nancy points to dough. "Hey, look what I made."

3.35 Richard looks but does not respond.

3.37 Nancy turns over play dough, pats it, cuts it off with a plastic block.

3.49 Richard watches her.

3.55 Nancy cuts dough again.

4.00 Nancy pinches off a bit of dough and puts it in the middle of the square indentation she has made.

4.09 Drinks some juice, watches Richard.

4.23 Cuts on playdough with knife.

4.25 (Mother sits down at table with book, observing Nancy.)

4.38 Mother watches. Nancy punches fist into play dough and pounds it.

4.50 Makes another square indentation with block.

5.00 Repeats. Pounds block with fist.

5.10 Pinches off a bit of play dough and places it in square. Places block again and pounds (trying to cut all the way through).

5.24 Kneeling on chair, she pushes again at block and play dough using her whole body.

5.30 Sits again and looks into glass of juice.

5.38 Picks up play dough, square piece falls out.

5.44 Nancy: "Look what I made, Mommy."

5.50 Mother: "Ooh, that's a biscuit."

5.54 Some dough falls on floor. Nancy: "My biscuit fell." Mother: "I'll get it." and does. Mother asks "Do you want to put it on a plate?" Mother puts it on plate.

6.03 Nancy moves it to middle of plate: "I'm going to make another one."

6.16 Mother sits down. "Okay." Nancy makes square indentation in dough.

6.25 Nancy: "Here, I'll make a piece." Mother, reading, doesn't hear.

6.35 Nancy looks under play dough. Makes another square. "I've made a muffin."

6.49 Makes another square. Nancy: "Two windows;" counts them, "one, two." (Nancy continues with this activity past the end of the observation.)

Commentary:

This excerpt is remarkable for the length of time Nancy spends at an activity which is relevant to the learning of spatial and fine motor skill and also to the development of the imagination. Nancy makes an original association to the materials ("You've made a hat,") and enters into an extended role play sequence, which, at this age, is highly indicative of superior cognitive development. In this episode Nancy's mother for the most part merely observes Nancy in an approving fashion, while her brother participates in the activity with her. Her behavior is unusual compared to the average mother in that she suggested and provided the materials for Nancy to work with the play dough, and took the time to sit with the children while they were playing. This seemingly trivial detail indicates a significant characteristic in Mrs. N. Routinely, Mrs. N makes time to sit for half an hour or so with the children, reading, watching Sesame Street, joining in some "intellectual activity" or merely observing them. Mrs. N is outstanding among mothers in Classes III, IV and V in this respect and

and in her up-to-date knowledge of how Nancy is developing, what activities interest her and what she learns from them. Among our mothers of two-year-olds she was one of the few who would describe in detail the several concepts which the program "Sesame Street" attempts to convey, who had firm ideas about the educational value and age-appropriateness of different types of toys, and an articulated philosophy about how a mother should promote intellectual and social development in a young child.

Nancy's excellent social and intellectual development should be contrasted with that of Robert who is the subject of our fourth case study.

Robert: A two-year-old "C" boy

Robert was just two-years-old when we started observing him. He is the youngest child in a family of six children. Robert's mother and father are in their thirties. We predicted that Robert would develop below average intellectually on the basis of a Stanford Binet IQ of 83 of the sibling closest to him in age who was not yet in school, and the generally poor performance in school of his older brothers and sisters. This prediction is clearly being borne out by Robert's test performance. At 24 months Robert's test scores were already below average, and through the period of our observations they became progressively worse, his test scores at 30 months being actually lower than at 24 months.

Robert's background: Physical Environment

Robert's family lives in a public housing project in a residential area of Greater Boston. The project is a small one composed of four rows of adjoining houses, two stories high, around a central courtyard.

The neighborhood is mostly residential, consisting of one-family and multiple-family dwellings generally in poor state of maintenance, and a few small stores. The children in the project mostly play in the courtyard which is equipped with swings and a slide and a paved path for cycling.

Robert's house consists of five rooms -- a living room and kitchen on the first floor, and three small bedrooms for parents, girls, and boys, on the second floor. Robert shares a bedroom with his brother, age four. The interior is dark, for lack of windows, and is in a poor state of repair, with furnishings mostly old and shabby.

Human Environment

In terms of income, residence and education, Robert's family is in Class IV. His father left school in ninth grade and works as a semi-skilled operator in a steel works. His mother left school in the tenth grade, and has a part-time job waitressing in the evenings. When we first started observing Robert, the family income was between $5,000 and $7,000, but during our second period of observations, when Robert was 24-27 months old, Mr. R lost his job and the family went on welfare until his father found part-time maintenance work.

All our observations were done when Robert was in his mother's charge and most of his interaction with people is with her. Mrs. R frequently put Robert out to play in the courtyard, and with a younger brother continually at home, and a father irregularly employed, Robert spent about a third of his interaction time with people other than his mother. Observed interactions between Robert and other children were seldom positive and never intellectually promising. Mostly they consisted of other children barely tolerating Robert's joining them in play out of doors, and not infrequently excluding him or teasing him. Robert nearly always seemed on the margin of other children's activities, and some children seemed to actively dislike him.

The personality of Robert's mother is of great importance to our understanding Robert's development and will undoubtedly play a large part in his predicted failure to become either intellectually or socially competent. Mrs. R's characteristic style of interacting with Robert is a mixture, extremely volatile, of bullying, teasing, restriction and affection. In every observation she referred to him with phrases such as "you bad boy," "Mr. Mischief," "trouble-maker," said sometimes with a smile, sometimes with a glare, sometimes with a slap or a shake. Without warning, a tickling or horseplay activity would turn into an occasion for threats ("I'll kill you;" "I'll beat you,") or shame. Occasional attempts on Robert's part to master some skill were often summarily interrupted and Mrs. R was never observed trying to teach Robert. Indeed, Robert is one of the few children for whom interaction with his mother often seemed intellectually deleterious. For example, although Table V-1 shows that one or two minutes out of an observation hour was devoted to "highly intellectual" activities in which both Robert and his mother were in some way involved, Mrs. R's mode of behavior on these occasions never included teaching, and often took the form of restricting or interfering with his activity. As an index of opportunity for learning, Robert's score on highly intellectual activities is therefore quite misleading--it should be much lower.

These points are best illustrated by excerpts from our actual observations on Robert.

Excerpt Number 1 This observation was done when Robert was 25 1/2 months old. At the start of the observation Robert was outdoors in the project courtyard, where a group of children are playing on the swings and slide.

0.00 Robert wanders through curtains hanging on a line. Mother: "Get out of there right now.

0.06 Robert walks away from curtains. Mother: "Go get your car, go ride your car. Where is your car?"

0.15 Mother returns to kitchen. Robert walks with finger in mouth, falls down, gets up.

0.29 Walks to sidewalk.

0.54 Robert goes to back porch of another apartment, hides from Observer.

1.00 He follows another child (male-older), sib brings car over to Robert (on Mother's orders). Robert walks by it, falls on it.

1.21 He sits on the car.

1.30 Robert pushes car with his feet.

1.41 He rides car under curtains

2.00 He then rides between the curtains.

2.30 He climbs off car to go to steps to his apartment;

2.45 He climbs up stairs.

3.02 Robert looks into the kitchen. Mother: "What do you want?"

3.04 Robert looks in.

3.15 He looks at the Observer. Mother comes to door.

3.19 Mother: "What do you want? Get down off the stairs. Smart Guy."

3.27 "Get down the stairs."

3.30 Mother takes hood from his head, pats Robert. Mother: "Hold on."

3.39 Robert goes down stairs, walks along sidewalk area.

3.50 Mother keeps watching.

3.55 Robert gets behind car and pushes it.

4.00 Mother: "Give me a ride." Robert looks at her, puzzled.

4.07 "Bad guy."

4.11 Robert looks at Observer, goes to steps. Mother: "No, get down the stairs and play."

4.22 Mother opens door and points down stairs.

4.30 Robert looks at Mother, eases self down stairs.

4.40 He sits on bottom step. Mother stops watching him.

4.44 Robert stares ahead.

5.00 He stands, walks along walk, wanders, looks at other kids playing.

Commentary:

This excerpt shows Robert in a typical light. For the most part he spends his time wandering about or engaging lethargically and by himself in unstructured play, carrying, pushing or pulling toys about. Instead of trying to engage and sustain Robert's interest in an activity, his mother seems intent on getting him away from her by issuing commands ("Go get your car.") On the one occasion when she shows an interest in his activity, her behavior is inappropriate and has the effect of puzzling and threatening Robert ("Give me a ride" -- obviously she doesn't mean it -- "Bad Guy.") These particular events may seem inconsequential taken in isolation, but repeated over and over again they become a significant factor in Robert's human environment. A more extreme, but by no means isolated example of Robert's interaction with his mother and other children is seen in the next excerpt:

Excerpt Number 2   In this observation Robert is again in the courtyard and there are several children running about or talking to each other.

0.00 Robert looks at children, thumb in mouth. Wanders about with a blank look.

1.00 He spits (makes a spitting gesture) at a small girl (probably younger than him). The girl ignores him.

1.20 Robert babbles to the little girl. She ignores him. Robert wanders.

2.00 Robert leaves his pull toy on the path. Mother comes to door and talks to the neighbor about stray cats. Robert wanders over to slide (large) in the courtyard.

2.30 He goes up the ladder of the slide.

2.55 Mother sees him. "You better stay down off there, you hear! Get off! Off!"

3.05 "Get over here! C'mon!" Mother goes over. Robert starts down the stairs.

3.15 He walks towards Mother.

3.20 "You better move a little faster!" Mother holds and slaps him firmly. "If I walk away and you go up that slide I'll pull your pants down and give you a licking! You have your train and toys! Stay off that slide! You hear!" (She holds him by the shoulders as she says this).

4.05 Mother leaves. Robert hangs on to the pole of the slide with his head down watching his mother leave.

4.10 Small girl (no older than Robert) goes up the ladder a little way to show off to Robert that she's allowed.

4.30 Robert hides in back of slide with his head hanging down and rubbing his head against the slide. Small girl teases, "I can go up!"

4.40 Small girl whirls around the pole supporting the slide. Robert imitates (but they are not interacting really). He does this distractedly and seems to be preoccupied with what has happened with Mother.
5.00 Robert babbles to self (as if he were muttering angrily).

Commentary:

Of the ten observations our Environment group made on Robert, there were several in which Mrs. R physically or verbally assaulted Robert in the extreme way depicted here. This excerpt therefore describes a scene with which Robert is familiar (probably more familiar than our observations suggest considering his mother probably restrains herself in our presence). Other notable features in this excerpt are the extent to which Robert is excluded from the activities of other children and the way he is taunted by the little girl no older than himself. She clearly senses from observing Robert and his mother that Robert is an easy victim. Robert's interactions with other children in this excerpt is characteristic. We seldom observed Robert in friendly play with children, and in several observations he was teased, assaulted or deliberately ignored by peers.

Chapter VI

Discussion and Conclusion

Model of Intellectual Development Underlying our Research

The theoretical basis of development underlying our research is that intellectual development is a function of the child's interaction with his human and physical environment. At any particular stage in the child's development, the child's existing mental structure influences how he experiences that environment, and the experience in turn helps to reorganize and bring about qualitative change in the child's intellectual structure. All theories of intellectual development are of course interactional in some sense. Even extreme behaviorists such as Skinner allow some role to innately determined learning capabilities, while maturational theories (as exemplified by Gesell's, 1964) acknowledge that innately determined capabilities may be influenced by extreme environmental circumstances.

As Turiel (1969) and others have pointed out, the major difference between associationistic, maturational, and truly interactional theories such as Piaget's (1947) lies in the source of developing intellectual structures. Paraphrasing Turiel we might say that for the maturationist, the source is located entirely in innate structures which emerge with age almost regardless of the particular environment; for the learning theorist (or associationistic theorist) the source is located predominantly in the environment and development proceeds through direct teaching, conditioning and modelling; while to the interactionist, the source of intellectual development comes from the child's own organization of his environment.

In the interactionist's approach the way in which the organism deals with reality is partly a function of biological principles of assimilation, adaptation and equilibration. At any given point the child's stage of intellectual development is determined by his biological characteristics and his previous experiences. In turn both of these determine how a new "event" is experienced and what effect that new experience will have on changing the child's existing intellectual structure. As Turiel points out, we are really talking about multiple interactions, since three factors: the child's biological tendencies, his previous experience and the present experience, all come into play to shape his intellectual development.

The general role of the human environment in the child's interactional experiences

Although interactional theory places great importance on the role of the environment in the child's construction of his intelligence, it is curiously unspecific as to what is the best role for the environment to play in such interactions. For example, are certain forms of behavior on the part of child-rearers better than others for helping the child structure his intelligence? Do the most appropriate behaviors of child-rearers change with the child's stage of development? In contrast, behavioristic theory is very specific about the role of the environment. Reinforcements, contingencies, schedules and so on for shaping behavior are spelled out in detail, and the theory assumes that if these are properly applied the child learns more, that is, will become more intelligent. This overly simple notion has come under increasing attack for well deserved reasons which it is hardly necessary to recapitulate here.

One purpose of the present research is to begin -- in a small way -- to spell out the far more complex roles normally played by humans in the child's experiences (that is, the child's occasions for constructing his intelligence), and to point to the apparent relative efficacy of differing roles. Again we must stress that this research does not assume that the other person's (the interactor's) role by itself determines the child's intellectual progress. It explicitly states that progress at any point is determined by the whole interaction, that is what the child brings to the interaction by virtue of his biological capacities and his previous experience as well as what the interactor brings by virtue of his capabilities, his previous experiences and so on. Moreover, it recognizes that a most important part of that interaction is the child's and the interactor's previous experiences with each other so that each tends to influence the other and establish a mutually agreeable dyadic relationship.

An Analysis of Specific Roles Played by Interactors in the Child's Experiences

The present study focuses on the actual, observable roles played by other people in the child's experiences. We start by assuming that interpersonal interactions help to promote the child's intellectual development, that is, that they provide important opportunities for the child to construct his own intelligence. We assume that an observer can often judge that certain interactions are intellectually more valuable to the child than others. In keeping with our previous discussion, it must be stressed that the observer bases this judgment on the behavior of both the child and the other person in the interaction. The critical clues influencing the observer's judgment sometimes come predominantly from the child's behavior, sometimes from the behavior of the interactor, sometimes from both equally. (Design characteristics of objects used in the interaction may also play an important part in the judgment). Once the intellectual value of the interaction is judged, the role played by the other person in that interaction can be separately analyzed.

One can conceive of many alternative categorizations of interactors' roles. The system we have chosen to use in this study makes 15 distinctions among the types of behavior people normally use with young children and organizes these types into four major categories related to the child's activities: active participation, facilitation, observation, and restriction. Active participation occurs when the interactor is an integral part of the child's experience taking the part of an entertainer, playmate, teacher or conversant. Facilitation occurs when the interactor helps the child to realize the experience for himself, for example, by suggesting the activity, providing desired materials or helping him out with occasional difficulties. Observation is counted when the interactor merely listens to the child or observes the child, in order to inform himself on the child's progress or to check on him. Finally, restriction is counted when the interactor attempts to prevent or inhibit the child's experience. The basic underlying idea in this system is that another person can help intellectually valuable experiences to happen or not happen for a child, and can make them more likely or less likely to recur in the future.

Differences in the Roles Played by Interactors with Well-developing and Poorly-Developing Children

Our study was designed to enable us to compare the roles played by interactors with children who by age three had attained high levels of intellectual competence ("A" children) and interactors with children who had achieved relatively low levels of intellectual competence ("C" children). When social class differences are controlled, our findings may be simply stated. First we found that interactors with A children -- their mothers, fathers, siblings, and other people who come into contact with them -- spend much more time than interactors with C children involved in intellectually valuable activities with them. The interactor's role in these intellectually valuable experiences may take the form of active participation, facilitation or mere listening and observing, but, whatever his specific role, the interactor with an A child is much more likely to relate to that child in the context of an intellectually valuable activity than the interactor with the C child.

But this is not the whole story. The actual role played by the interactor in the child's experiences also seems to be of fundamental importance. Specifically, interactors with A children spend proportionately more time *actively participating and overtly encouraging the child's intellectually valuable experiences* than interactors with C children. The latter, in contrast, spend more time *participating in and encouraging the child's purely social-physical activities* (exemplified by roughhousing and playfighting). These findings hold equally strongly in a comparison of working-class As and Cs as in a comparison of middle-class As and working-class Cs. They hold whether one considers time spent on intellectually valuable interactions as a proportion of total time the child is observed, or as a proportion of the total time the child spends interacting with other people. They also hold whether one considers only the role of the child's principal caretaker (normally, his mother), or whether one considers the role of all people who are observed interacting with the child.

Our principal conclusion from these findings is that the human environment of the A child is much more likely than that of the C child to help *create* for him experiences that promote his intellectual development. The word is used deliberately to convey the idea that when an interactor actively participates in a child's intellectual experience he is an integral part of that experience for the child. This is not to say that the interactor's behavior is, by itself, the determinant of the child's development, or that the child's behavior in the interchange is normally passive. Rather, the entire interaction is the determinant, and the child's role in it is typically active and creative as much as the other person's.

A second important conclusion is that the human environment of the A child is also *generally* more conducive to his enjoying intellectually valuable experiences than that of the C child. This conclusion is based on the finding that interactors with A children are more likely to show *overt encouragement of the child's intellectually valuable experiences*. Overt encouragement may be conveyed by a variety of techniques in addition to active participation in the child's activities. For example, the interactor may suggest an activity, supply materials, praise the child, or listen to him attentively. The use of none of these specific techniques, except for active participation, significantly distinguishes the behavior of interactors with A and C children. Yet, together, they seem to convey an attitude of encouragement of the child's intellectual strivings, and this turns out to be an important difference in the experiences of A and C children.

The Key Role of the Mother: the bringing about of intellectually valuable experiences for the child

In this section we shall talk about mothers rather than "interactors" since the mother is normally the child's chief caretaker and interactor in the child's first three years of life and the term "interactor" is too impersonal. We have said again and again that we believe that the determinant of the child's intellectual development is his own experiences, and that although a mother may crucially shape these experiences, it is nevertheless the whole dyadic interaction which the child also controls that is influential to his development. (We must also not forget that most of the child's experiences normally do not involve interactions with people but with objects and the general social and physical surroundings which he uses or observes. These experiences also influence his intellectual development and are influenced by the child's previous interactions with people and his mother's role as designer, regulator, and provider of his physical environment.)

The mother's key role with respect to the child's intellectual development may be stated simply. It is to bring about intellectually valuable experiences for the child. How can she do this most effectively? Our research suggests that with children this young the most effective strategy is the mother's direct participation in the child's activities. The mother is then in a position to guide the child's activities, if necessary, in an intellectually valuable direction, and to capitalize on the child's emotional attachment to her to make the resulting experience pleasurable and likely to recur in the future on the child's own initiative.

To be effective the strategy of direct participation requires first that the mother understand what is likely to constitute an intellectually valuable experience for a child at different stages of his growth. Certainly she need not think narrowly in terms of books, blocks, puzzles, or Sesame Street. Rather she should be aware that at one stage in a child's growth peek-a-boo is an intellectually challenging activity for him; at another, emptying the trash basket or sorting knives and forks is intellectually profitable; while at still another stage, dressing and undressing dolls, or racing toy cars are mind-building experiences. To attain skill in understanding requires that a mother spend time watching and listening to her child in order to learn to interpret the "vocabulary" of his experiences, that is, what they mean to him developmentally.

The strategy also requires skill on the part of the mother when she participates in the child's activities. Sometimes an experience is made intellectually valuable by the mother enacting the role of the child's entertainer (in the theatrical sense), sometimes by her taking on the role of the teacher (in the didactic sense), sometimes by her assuming the part of a peer (in the give-and-take playmate sense), and sometimes by her acting as a conversation partner. All of these techniques count as participation and so far there is nothing in our research to imply that one role is superior to another. Our guess is that what these approaches have in common is more important than how they differ. What they have in common is that they make the mother an integral part of the child's experiences, and puts her in a position to help create or shape experiences that may bring about qualitative change in the child's intelligence. She can do this sometimes by providing information, asking the right question or providing a provocative answer; sometimes by creating the right setting in her enactment of a role or arrangement of materials; sometimes by simply playing or working along with the child as if the task were equally interesting and pleasurable to her. Of course the direct involvement of the mother in the young child's activities has social, motivational and emotional aspects as well as cognitive ones. Bronfenbrenner (1973) has put this very aptly when, after reviewing the results of several years of intervention research, he states that the primary objective for the child's development in the first three years of life:

"is the establishment of an enduring emotional relationship between parent (or caretaker) and infant involving frequent reciprocal interaction around activities which are challenging to the child. The effect of such interaction is to strengthen the bond between parent and child, enhance motivation, increase the frequency and power of contingent responses, produce mutual adaptation in behavior, and thereby improve the parent's effectiveness as a teacher for the child, further the latter's learning and, in due course, establish a stable interpersonal system capable of fostering and sustaining the child's development."

At present we are a long way from knowing how cognitive, social, motivational and emotional factors interact to influence the child's intellectual development. But at the very least our data demonstrates that a fundamental difference between mothers of children who attain high levels of intellectual development and mothers of children who achieve much lower levels is that the former more often *actively* relate to their children in the context of intellectually valuable experiences, and that they selectively promote such interactions more and more as the child grows up. In contrast, mothers of less well developed children spend proportionately more of their active involvement with the child in the context of purely "social-physical" interactions (as exemplified by roughhousing and playfighting). Thus for the A child, the social and emotional bond with his mother is more likely to be built up in the context of intellectually profitable interactions, with the likely result that these experiences are more and more valued and sought out by the child in the future.

Recommendations for Future Research

Our research has focused predominantly on the role of human environment in promoting the young child's intellectual development. From our experience in this study we feel confident in making two strong recommendations to funding agencies with respect to future research. These are:

First, that much more support be given to research on *interactional* processes between the child and his human and physical environment. There is great need for more powerful and comprehensive conceptualizations of these processes and a parallel need for sophisticated methodology. Future research must focus on reciprocal interaction as a basic unit of the child's experience and investigate the role various environmental factors play in this interaction. This effort should include not only the analyses of direct interactive observable roles played by people and things in the child's experiences, but should extend to the indirect roles played by caretakers in designing and regulating the child's environment, and also to the more remote yet powerful roles played by social, economic and legal structures in influencing the types of interactions caretakers have with children. Among the poor, time and energy to interact with young children may be so limited by lack of money, space, crowdedness, job responsibilities, etc. that the constraints put on the family by society is clearly more to the point **than** a micro-analysis of intra-family dynamics.

Our second recommendation is that the funding agencies give greater support to systematic research -- especially direct observational and longitudinal studies -- of social and emotional factors affecting development in early childhood. From our experience in this study we are convinced of the extraordinary importance to intellectual growth of social, motivational, and emotional factors in addition to "cognitive" factors.

The Preschool Project (White, 1972) has made a notable start toward researching one of these areas -- social competence -- but even here much more effort needs to be put into defining the relevant variables, observing how they are manifested by the child in his natural milieu and demonstrating how environmental factors influence their growth.

Recommendations for Practical Applications

Our research has a multitude of practical applications. These include the use of our basic methodology in evaluating child care centers, and in the training and credentialling of child care personnel. We are about to embark on a study of young children (age 1-3) in group care settings* and will be applying an extended version of our present observational system (The HOME

Scale-Watts, Barnett, Halfar, 1972) to study the relationship of environment, experience and intellectual and social development in such settings.

Our first recommendation then, is that evaluation of Home Care, Day Care, Head Start and other group-settings for the education of the young children routinely include a strong field-observation component. The experience of Head Start evaluation has already demonstrated that it is misleading to accept curriculum model labels without checking on how the model is actually implemented in the field. Further, that the variety of experience actually encountered by individual children within any one model may far exceed the differences between models, thus accounting for the lack of major differences between models in reported research.

A similar set of considerations apply to the evaluation of parent-child training centers, home-tutoring intervention projects, and the like. These projects should include the use of reliable methods for observing interaction between teacher and parent or teacher and child in the training phase, as well as for observing parent-child interaction in the home (in these projects, the child usually spends most of his time with his mother rather than the teacher). Unless reliable evidence is collected as to the implementation of the tutoring program by the mother in the home, the results of such projects may be uninterpretable.

Our second recommendation which we think should take great priority with funding agencies is that much more information, financial support and educational guidance be given to those who take care of young children -- including parents, parent-substitutes, day care and family care personnel. In our own research we have been constantly surprised at how poorly many mothers understand what the child's experiences mean to him and how their behavior may affect his experiences. Popular accounts of what goes on in day care and family care settings also frequently suggest that inadequate knowledge of early child development is demonstrated in the design and implementation of such programs. We may be able to document this point in greater detail in our study of young children in group care settings, but we do not need further research to state that a top priority for funding agencies concerned with childhood education should be more vigorous mass dissemination of basic information on child development. This information should include topics such as the following:

1. Developmental stages in physical growth of children, in their play with objects, in language acquisition, and in the development of social competencies and so on. The emphasis here should be on educating children's caretakers to understand the meaning of various experiences for the child, that is to interpret the "vocabulary" of the child's behaviors.

2. Ways caretakers can enhance these developments by appropriate actions and physical arrangements in the home or center, or retard these developments by inappropriate actions and arrangements.

3. The idea that while some practices seem universally better for all children than others, a great deal of inter-individual and cross-cultural variability is permissible and desirable.

4. The idea that some "ecological" minimum (money, space, food, time for children, etc.) is a prerequisite to enable a family or center to function as caretakers at all, let alone "good" caretakers.

5. The detection of abnormalities, both gross and borderline, and why it is important to seek out early remedial help.

6. The idea that the promotion of optimum development in early childhood is a necessary base for education at all later stages.

How should such a program of disseminating information for public education be undertaken? Certainly through the printed medium up to a point. We ourselves have made a start in this direction by preparing a full report to parents who took part in our study, describing the experience we saw their children having the significance we attached to these experiences, and how the parents' behavior might have helped or hindered their child's progress (Barnett, Halfar, and Watts, 1973). However our judgment is that mass dissemination of basic information on child development is much more easily, vividly and economically accomplished through visual media -- particularly films and television. This treatment should aim to be as entertaining for parents as Sesame Street is for children. And the fact that we are far from knowing everything there is to be known about child development should not deter this undertaking any more than ignorance of how to teach a young child deterred the originators of Sesame Street. Enough is known to make a start, now.

Our third recommendation deals with the issue of home care versus day care. We remain open-minded on this issue, finding it impossible to discuss rationally unless the home and day care alternatives are specified, and unless the child care options available to the parent are also realistically confronted. Again, it seems to us that much serious research has to be done on factors relating to child development in group settings before general recommendations can be advocated.

Our final point addresses the issue of "curriculum" in the home or child care center. Our research suggests that active involvement by mothers and teachers in the child's intellectually valuable activities is a most effective strategy for enhancing the young child's intellectual development, and that structure, both in the physical arrangements of objects and in activities, is critical. At the same time, our research points to a key factor that is at the heart of the concept of "open education." This is that an essential part of the teacher's role is to help ensure intellectually profitable experiences for the child by providing **a developmentally suitable environment.** The idea of open education has often been distorted to mean that the teacher should simply allow the child's experiences to "happen" entirely under his own initiative. In actuality, a child's experiences do not just happen. They are always influenced by his human and physical environment. If this environment is chaotic, dull, or too passive, the quality of his experience is lowered. For the child to have "wonderful ideas" (as Duckworth so vividly puts it, 1972), he needs first someone who is able to make him feel that the having of wonderful ideas is an important and marvellous thing. Second, he needs the other person to provide for him a setting in which he can move about, explore, experiment, hear people talk, talk to himself, talk to other people and the like, with the secure knowledge that those he loves and who have power over him understand, approve of and enjoy what he is doing. Third, he needs that person to help provide information, materials, interesting comments, questions, role models, and so on which he can assimilate to his own intellectual structures and make his own cognitive leaps forward. Fourth, he needs that person to be attentive to his activities, to watch, listen, learn to take his perspective, and to understand the significance of the experience for him.

We close this section with a quotation from Duckworth (1972) which expresses as beautifully as anything we've seen the essence of our argument:

> "...wonderful ideas...need not necessarily look wonderful to the outside world. I think there is no difference in kind between wonderful ideas which many people have already had, and wonderful ideas which nobody has happened on before. That is, the nature of creative intellectual acts remains the same, whether it is an infant who for the first time makes the connection between seeing things and reaching for them, or Kevin (a seven-

year-old) who had the idea of putting straws in order of their length, or a cook who conceives of a new combination of herbs, or an astronomer who develops a new theory of the creation of the universe. In each case, it is a matter of making new connections between things already mastered.

The more we help children to have their own wonderful ideas, and feel good about themselves for having them, the more likely it is that they will some day happen upon ideas that nobody has happened upon before."

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APPENDIX

The Human Interaction Scale

The Object Interaction Scale

Typical Day Questionnaire

First Home Interview

Final Home Interview

Human Interaction Scale *

MANUAL FOR THE SCALE

- I. Definition of Dimensions
  - 1. Activities
  - 2. Initiation Index
  - 3. Encouragement Index
  - 4. Interaction Techniques
  - 5. Compliance Index
- II. Guidelines for Using the Interaction Scale
  - Recording Raw Data
  - Coding Steps
  - Phase Units
  - Other Guidelines
  - Sample Protocol

REPORT ON RELIABILITY STUDY--ACTIVITY DIMENSION

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*This Scale was developed by: Jean Carew Watts (Project Director), Itty Chan Barnett (Assistant Director), Nancy Apfel, Christine Halfar, and Geraldine Kearse (former staff member).

PART I: DEFINITION OF DIMENSIONS

The following five dimensions will be defined and described with examples:

1. Activities
2. Initiation Index
3. Encouragement Index
4. Interaction Technique
5. Compliance Index

Dimension 1--Activities

The Activity dimension refers to the behavior of the child. For purposes of this scale "behavior" includes the following:

The child's actual ongoing behavior
Behavior which is being prepared for and is likely to occur
Behavior which is suggested but which may or may not occur.

Cluster I: (Highly Intellectual Activities)	1 = Verbal, Symbolic Learning 2 = Spatial, Perceptual, Fine Motor Learning 3 = Concrete Reasoning 4 = Expressive Skills 5 = Executive Skills
Cluster II: (Moderately Intellectual Activities)	6 = Exploration of and Play with Household Items 7 = Play with Toys 8 = Exploration of Nature 9 = Gaining General and Routine Information
Cluster III: (Non-intellectual Activities)	10 = Basic Care 11 = Gross Motor Activities 12 = Unspecific Behavior
Cluster IV: (Social-Emotional Activities)	31 = Positive Social-Emotional Behavior 32 = Negative Social-Emotional Behavior 33 = Neutral Social-Emotional Behavior

In assigning the Activity dimension of an interaction an attempt is made to answer this question: What opportunity does the behavior present for the child's development? The identification of Activity is based on a consideration of several observable components: the quality of the child's behavior, the characteristics of material objects involved, and the behavior of the other person in interaction with the child. A brief description of the clusters of Activities and some introductory examples will now be presented.

Cluster I Activities are situations which are likely to lead to intellectual gain for the child. The non-specific way in which these Activities are defined permits their application to a variety of situation. Thus, opportunities for learning are seen as occurring both in the structured use of "educational materials" and "lessons," (e.g., looking at books, using a shape sorting box, painting a picture), as well as, in the less formal events which mother or child may elaborate into situations for learning (e.g., labeling pictures on boxes, using kitchen utensils as materials for classification, designating a row of chairs as an imaginary train).

The following are three examples of Activities from Cluster I:

a) Mother reads the child a story. Child looks at the pictures in the book. (Activity 1--Verbal or Symbolic Learning)

b) Mother is dressing the child for bed and labels the pictures printed on the fabric of the child's pajamas. Child repeats the labels after Mother. (Activity 1--Verbal or Symbolic Learning)

c) Child stacks several tin cans in decreasing order of size. Mother notices and comments: "Oh, you've found the cans." (Activity 2--Spatial, Perceptual, or Fine Motor Learning)

In the first example the mother's behavior, the child's behavior, and the nature of the material all point to learning for the child. In the second example the material, the child's pajamas, is not designed for use in connection with intellectual experience, but the behavior of both mother and child indicate that, in fact, the routine event of being dressed has become an opportunity for learning. In the third example, the child's behaviors of stacking and ordering are the indicator of a learning experience, although neither the mother's response nor the qualities of the objects involved would in themselves indicate the likelihood of learning for the child.

The Activities in Cluster II are situations of generalized experience which are not readily related to cognitive acquisition. In behaviors involving material objects it is the undifferentiated use of the objects rather than their particular qualities which indicate an only moderate likelihood of intellectual gain.

The following two examples illustrate the quality of Cluster II Activities:

a) Child is chewing on the corner of a book. Mother takes the book away. (Activity 7--Play with Toys)

b) Mother opens a cupboard door in the kitchen and tells the child: "Here are some things to keep you busy." Child begins taking boxes and cans from the shelves. (Activity 6--Exploration of and Play with Household Items)

In the first example the material, a book, is designed for intellectual activity, but the child is using it inappropriately with respect to cognitive learning. In the second example neither the materials, mother's behavior, nor the child's behavior present clear indications of this situation as an intellectual activity for the child.

The Activities in Cluster III are routine situations which have little likelihood of promoting cognitive gain for the child. Material objects and the behavior involved in Cluster III Activities are relevant only to the care of the child's physical needs and his large motor development.

The Activities in Cluster IV are situations in which the primary focus is emotional expression or social behavior.

Definition of Activities:

1. Verbal and Symbolic Learning

This Activity indicates that the main focus of the child is the *acquisition* of *verbal skills*, such as building of receptive vocabulary, mastery of articulation and expressive speech, and use of language materials (*e.g.*, picture books, children's records, and educational TV programs which promote verbal skills). In this Activity, the child is often engaged in Labeling objects or pictures, putting words together grammatically, counting, reciting, or attending to books, educational TV, or other media for language skills. This Activity may be suggested or elicited by another person. The following are some common examples* typifying this Activity for children age 1-3:

a) M touches S's eye and says "eye." S repeats. M asks: "Where is Mommy's eye?" S touches M's eye. M asks: "Where is Mommy's nose?" S touches M's nose.

b) S points at a balloon on his pajama and says "red". M corrects: "No, *blue*. It is a blue balloon." S says "blue." M says: "Can you find another blue balloon?" S points correctly.

c) M and S are getting ready to read a picture book, S says: "Good Night, Moon" (title of the story) and points at a balloon on the floor: "Moon?" M laughs: "No, that is a *balloon*. That is different from *moon*." S says "Loon?" M says: "That is right." S says "Moon?" M says: "That is a balloon." M points at the moon picture in the book then at the balloon, and says: "Moon and balloon." S repeats: "Moon, loon."

d) S feels his soup bowl and says to M: "Hot." M says: "No, it is not hot. It is *warm*. See, Mommy's tea is *hot* (M moves her cup over for S to touch). Joe's soup is warm."

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*In all the following examples, S = subject child, M = mother, F = father.

e) Sister teaches S to recite "Humpty Dumpty sits on a wall . . . etc."

Exclusion:

a) S is eating soup at the lunch table and says to M: "Hot." M says: "Hot? Let me put some cold milk in," and pours some milk in S's soup. (Basic Care)

b) Sister directs S to sit on the chair and says: "You are Humpty Dumpty." S complies. Sister says: ". . . Humpty Dumpty falls down." S jumps down and curls up on the floor. (Expressive--Role Play)

c) M stops in the middle of a story and asks S: "Can you find the mouse?" S looks for the mouse imbedded in the details of the picture. (Spatial and Perceptual Learning)

d) S and M are pulling a belt. M teases: "My belt." S echoes: "My belt." M says: "It is mine." S echoes: "Mine." M echoes back: "Mine." S and M chant "Mine" over and over, and they laugh. (Enjoyment of Social Game)

2. Perceptual, Spatial, and Fine Motor Learning

This Activity indicates that the main focus of the child is differentiation in visual perception and spatial orientation, or acquisition of skills for perceptual and fine motor coordination. In this Activity, the child is often involved in visually sorting or matching colors and shapes (when the main focus is not on verbal labeling), in understanding size, distance, angle, and spatial perspective of objects, in fitting, stacking, molding, or pasting tasks, or in using those materials which are designed to promote skills in perceptual and fine motor learning, such as a magnifying glass, binoculars, puzzles, a shape sorting box, nesting cups, tinker toys, Lego blocks, stacking blocks, scissors, and crayons. This Activity may be suggested or elicited by another person. The following are common examples typifying this Activity for children age 1-3:

a) M shows S how to stack three graded mixing bowls on the floor.

b) S concentrates in putting the button through the button hole. S accomplishes it. M praises.

c) S looks through the binoculars. M says: "Can you see Mommy?" S looks and says: "Yes, I see you, Mommy."

d) S fits shaped blocks into the shape-sorting box. M looks on.

Exclusion:

a) S makes spaghetti with playdough. M says: "Mm... Yummy." (Expressive--Role Play)

b) S asks M to button up his shirt. M complies. (Basic Care)

c) M directs S in putting blocks away on the toy shelf. (Executive Skill)

3. Concrete Reasoning

This Activity indicates that the main focus of the child is concrete reasoning and the formation of concepts such as object permanence, differentiation of means and ends, classification, dissonance, causality, and scientific law of momentum. In this context, the child often engages in "hide and seek" situations or is involved in experimenting with gravity, equilibrium, weight, etc., in categorizing similarities and differences, in investigating the reflection of images or the reverse side of an object, in exploring the operation of mechanical or electrical equipment, or in revealing foresight in planning, anticipation, or understanding of means-end relationships. This Activity may be suggested or elicited by another person.

For this particular Activity, there are subcategories. They are listed below with their assigned numbers:

1 = object permanence (which includes peek-a-boo games and searching for a lost object)
2 = differentiation of means and ends
3 = scientific laws and principles (which include the laws of gravity, momentum, buoyancy, trajectory phenomena, shadow phenomena, reflection, equilibrium, and the relationship of cause and effect)
4 = abstract categorization and classification
5 = miscellaneous (which includes the recognition of dissonance, the ability to dual focus, dumping objects from a container, high level exploration, recognition of the reverse side of an object, originality in problem solving, interesting associations of uses of an object).

The following are some examples typifying each subcategory:

1) Object Permanence:

a) S pulls the bedspread over her head. M says: "Where is Veda?" S unveil her face. M says: "Peek-a-boo. There she is!"

b) S is eating raisins in a highchair. S drops some and they disappear from view. M asks: "Where did they go?" S looks and finds them under M's chair.

c) S and older sister play hide and seek game.

2) Differentiation of Means and Ends:

a) S's ball rolls under the washer. M suggests that S use a track from his train set to get it out.

b) S wants to go into the dining room, but there is a big toy box blocking the doorway. M watches as S goes through the kitchen and pantry and enters the dining room through the other door. (Detour)

3) Scientific Laws and Principles:

a) S throws little wooden dolls out of his playpen one by one and watches them fall. M puts the toys back into S's playpen.

b) S turns the light switch on and off. M tells her to stop. (Causality)

c) S looks at his own reflection on the metal bottom of a toy box. M asks: "See the baby?" (Reflection)

4) Abstract Categorization and Classification:

a) S takes out some rubber animals from a box and lines them up on a low table. M looks on and says: "You have many animals" (Categorization)

b) S helps M put the silverware away. M says: "Put the big spoons here and the little spoons there." S sorts the spoons and put them into two piles. (Classification)

c) M and S are looking at a picture book. M points and says: "Here is the Daddy cat, here is the Mommy cat, here is the Sister cat, here is the Brother cat, and here is the Baby cat. That is a nice cat family." (Categorization?)

5) Miscellaneous:

a) S puts shoes on the wrong feet. Then she realizes it and corrects it. M praises. (Dissonance)

b) S is busy lining up beans on the bench. M walks by S's back and goes into the bathroom. Sister comes and calls M. S tells sister: "Mommy is in the bathroom." S has not moved his eyes away from his beans all this time. (Dual Focus)

Exclusion

a) S eats raisins and drops some in front of him in full view. S picks them up and eats. M looks on. (Basic Care--food behavior)

b) S throws toy out of playpen and cries, wanting to get out. M ignores. (Negative Social and Emotional Expression)

c) M gives S a box of kitchen equipment. S puts cake decorating tubes in and out of the flour sifter one by one. (Play with Household Items)

4. Imagination and Expressiveness

This Activity indicates that the main focus of the child is the expression of imagination and fantasy or the creation of representational products. Often, the child is involved in pretending to be someone or something (role play), in assigning roles to symbolic toys or objects in his play, in portraying an imaginative role in fantasy play, in telling make-believe stories, or in creating representational products such as painting "a monster," constructing a block "garage," or building a sand castle. The following are some common examples typifying this Activity for children age 1-3:

a) S and older sister are playing with dolls. S rocks her "baby" in her arms and gives her "baby" a toy bottle. (Expressive--role play)

b) S and peer are playing doctor. S examines peer's belly with a small block. (Expressive--use make-believe object in role play)

c) M folds handkerchief to make twin dolls and hands it to S: "Here are Jackie's twin babies." S hugs the twins. (Expressive--role play)

d) S scribbles lines with red crayon and tells M "Fire". (Expressive--creative work)

e) S and older sister have a "tea party" with S's toy tea set. (Expressive--role play)

f) S puts on a pair of "spaceman shoes," turns the knobs on an airconditioner and talks into its electric cord: "1, 2, 3, Go!" Peer starts to run. (Expressive--role play)

Exclusion:

a) S concentrates in dialing the playphone with his index finger, obviously trying to master the fine motor coordination. M praises. (Fine Motor Learning)

b) S takes a doll to her sister. (Play with Toy)

5. Executive Skills

This Activity indicates that the main focus of the child is the acquisition of practical, executive skills which call for patterned steps to accomplish an end goal. Often, the sequential task also involves fine motor learning and concrete reasoning, but sequencing of execution is the prominent aspect. In this Activity the child may be involved in carrying out instruction, in following sequential steps in games, in doing little errands such as fetching the newspaper, or in participating in household chores, such as picking up toys, sponging the table, or unloading dishes. These activities may be suggested or solicited by another person. The following are common examples typifying this Activity for children age 1-3:

a) S unloads the dishwasher for M and puts the dishes on the table.

b) M, S, and brother are raking leaves on the terrace. S is using a small rake to gather leaves into a pile.

c) S carries a bag of rubbish to the incinerator with M. M lifts S up for S to drop the bag into the incinerator.

d) M puts a clean sheet on S's crib and hands S the dirty one, saying: "Put it in the cellar for Mommy." S carries the sheet to the kitchen, opens the cellar door and throws the sheet down the stairs.

e) S plays "Ring Around the Rosy" with sibs. S flops down when sib says: ". . . All fall down."

Exclusion:

a) S pulls the dish washer in and out, repeatedly. M stops S. (Explore Household Item)

b) S gets the key from M and tries to fit the key in the key hole. (Fine Motor Learning)

c) S smells the leaves he raked. M watches. (Explore Nature)

d) M suggests S pick up toys. S sorts out all the match-box cars and puts them in a special box. (Concrete Reasoning--Categorization)

6. Exploration of Household Items

This Activity indicates that the main focus of the child is the investigation of places and objects in the household (here household is extended to include also any man-made dwellings, structures and objects). Through such investigations, the child is presumed to gain a certain amount of undefined cognitive input. (If the input could be more clearly defined and could be coded as an Activity at the higher level, it would be elevated to an Activity included in Cluster I). In this Activity, the child is often involved in getting into places and non-playthings, in inappropriate use or abuse of property, or in unsafe situations. Going places and playing with household objects may be suggested and solicited by another person. The following are some common examples typifying this context for children age 1-3:

a) M pulls out her kitchen drawer for S. S takes out pots, pans, cooking utensils, aprons and pot holders, etc.

b) S hesitates about going up the backstairs leading to neighbors on the second floor, and says: "No, no" to himself. Finally S goes up. Father comes to get S down and scolds S.

c) S puts her hands in the toilet bowl and splashes the water inside. M stops S.

d) S tries to poke her finger into the electric outlet on the wall. M removes S.

e) S gets into M's handbag, taking out bits of paper, a hairbrush, and some bobby-pins. M says: "No, Vera." S ignores M and takes out more things.

Exclusion:

a) M opens kitchen drawer for S. S takes out pots and pans. S tries to fit a lid on the right pot. (Spatial,and Fine Motor Learning)

b) S turns the switch of the television on and off. M says "No" and carries S to the kitchen. (Concrete Reasoning--Causality)

c) S plays with M's handbag, carrying it on her arm and walks around, assuming an important air. (Expressive--Role Play)

d) S gets on the coffee table, then jumps down. Repeats. M cautions S to be careful. (Gross Motor--Jumping)

7. Exploration of Toys

This Activity indicates that the main focus of the child is the use and examination of playthings. Through "play" the child is presumed to gain a certain amount of undefined cognitive input, in addition to enjoyment. (If the input could be more clearly defined and coded as an Activity at a higher level, the play would be elevated to an Activity included in Cluster I). In this Activity, the child is often engaged in manipulating or transporting toys, in using toys in an unspecified manner, such as moving a toy truck back and forth, or in inappropriate use or the abuse of toys. Play with toys is frequently suggested and solicited by another person. The following are some common examples typifying this context for children age 1-3:

a) S is in a jumper chair. M hands S a Playplax piece. S holds it, bangs it on the tray and mouths it.

b) M suggests playdough. S pounds on it and squeezes it.

c) S lines some rubber animals on the table and moves them around. M watches S.

d) S rips a picture book. M says: "No, that's a no-no."

e) M puts a song record for children on. S listens to "Skip to my Lou" and other songs.

Exclusion:

a) S lines up toy animals on the table. M says: "Stephanie has many animals. (Concrete Reasoning--Categorization)

b) S lines up some stuffed animals on the big bed and puts a blanket on them. S tells M: "They go night-night." (Expressive--Role Play)

c) M hands S some playdough and demonstrates how to roll it out with a rolling pin. (Fine Motor Learning)

d) M and S listen to a story record--"The Little Engine That Could" (Verbal Learning)

8. Exploration of Nature

This Activity indicates that the main focus of the child is the exploration of living things--plants and animals. Through such exploration, the child is presumed to gain information about the world of nature and/or acquire skills in caring for and handling living things. (If the cognitive gain from such explorations could be more clearly defined and could be coded as an Activity at the higher level, the exploration would be elevated to Cluster I). In this Activity the child is often involved in examining plants and flowers, watching birds, fish, or other small animals, taking walks in woods and parks, or playing with pets and caring for them. These may be suggested or solicited by another person. The following are common examples typifying this Activity for children age 1-3:

a) M asks: "Who would like to see the fish?" S says "Me" and looks at M sprinkle some fishfood into the aquarium.

b) S and M pat a kitten together.

c) M pushes S in her stroller and goes around the block for a walk. M points at some flowers and says: "Look, Stephanie." S looks at the flowers.

d) M suggests S go look for some ants. S squats down and watches the ants crawling around on the ground.

e) S crumbles a rose. M says: "Don't break it. Smell it." S smells the roses in the vase.

Exclusion:

a) S is patting a kitten. M labels for S: "Kitty." S babbles in response. (Verbal Learning)

b) S crumbles a rose. M tells S to sweep up the petals and hands S a brush and a dustpan. S tries to sweep up the petals. M helps. (Executive Skills)

c) S puts a long stick across his chest under his overall bib and runs around the room, flapping his arms and saying to himself: "I am a big bird." M watches and laughs. (Expressive--Role Play)

9. Gaining General and Routine Information

This Activity indicates that the main focus of the child is gaining general information about his daily routine life and the wider world around him. Through such general information, which is often trivial, the child is presumed to gain knowledge of the world which may lead to further cognitive inquiries and input. (If the cognitive input from this general information is more clearly defined and could be coded as an Activity at the higher level, it would be elevated to an Acticity in Cluster I). In this Activity, the child is often involved in requesting routine information, seeking feedback in his factual knowledge, giving statements of obvious facts, or watching children's entertainment programs or adult programs on television. These may be suggested or solicited by another person. The following are some common examples typifying this Activity for children age 1-3:

a) M and S are at the mail box in the main lobby. Someone goes out the door. S asks: "What, Mommy?" M informs: "That was the storeman. He just went out the door."

b) S questions M: ". . . Tina home?" M says: "Not yet, in the afternoon." S repeats: "Tina home in the afternoon?" M says: "Right."

c) S asks M: "Where is Mark?" M informs: "Mark is in the playroom."

d) M tells S: "I am going down to put the laundry in the washer." S says: "OK." M leaves for downstairs.

e) M asks: "Where are your sister's shoes?" S says: "Here," and points under the table.

Exclusion:

a) M is getting S's party clothes ready. S points at her patent leather shoes and asks: "My party shoes are black?" M says: "Yes. They are black." (Verbal Learning--labeling color)

b) M tells S she is going downstairs. S goes down with M and follows M around while M does laundry. (Neutral Social Behavior--Maintaining social contact)

10. Basic Care

This context refers to the activity or behavior contents in which the child's focus is satisfaction of biological needs and adjustment to social norms in meeting those needs. Here, the child is often involved in eating, bathing, using the toilet or being diapered, dressing, keeping clean and neat. These activities are frequently suggested or solicited by another person. Some common examples for children age 1-3 are listed below:

a) M serves S hotdog and potato chips for lunch.

b) M asks S if he is wet. S says: "No."

c) S and brother are taking a bath together in the tub.

d) S asks for another cookie. M provides.

e) M powders S and dresses her.

Exclusion:

a) S tries to cut his hot dog with knife and fork. M holds the hot dog steady for S. (Fine Motor Learning)

b) S is on the diapering table, being changed before her nap. S and M label the colors of the balloons on S's pajama. (Verbal Learning)

c) S and his brother are bathing together. S imitates his brother in squeezing the soap into pieces. (Play with Household Items)

d) S wants the Johnson's baby powder. M says: "Let Mommy show you." M shakes some powder on S and rubs it in. S tries to do the same. (Executive Skill)

11. Gross Motor Learning

This Activity indicates that the main focus of the child is the acquisition of skills for gross motor coordination or the use of equipment which promotes coordination of the large muscles. Here the child is often engaged in crawling, walking, climbing, running, pulling, pushing, or tossing behavior, or he is involved in balancing his body, as in kneeling, squatting, tip-toeing and whirling around, or he is involved in the use of certain playthings or playground equipment which promote gross motor coordination, such as bouncing seats, rocking horses, push-carts, swings, slides, tricycles, jungle gyms, rope ladders, or jump ropes. (If the child uses his body for high level exploration of physical phenomena the Activity coded would be appropriate to the intellectual content involved. For example, pedalling on a tricycle and then watching how long it takes for the tricycle to come to a stop would be elevated from a Gross Motor Activity to Concrete Reasoning--Momentum in Cluster I) The following are some common examples typifying this Activity for children age 1-3:

a) M holds S's hands and helps him to learn to walk.

b) S is sitting on the swing. Babysitter instructs S how to bend her knees and pump herself on the swing.

c) S pedals on his tricycle around on the playground. M looks on.

d) S does a somersault. Aunt looks on and claps her hands.

e) S takes a roller skate to M. M puts it on S's foot, and holds S's hand as he walks around on it.

Exclusion:

a) S approaches a downhill slope on his tricycle. S calls to M. M says: "Use your feet and go down slowly." S uses his feet as a brake and goes down the slope slowly on his tricycle. (Concrete Reasoning--Gravity)

b) S and her sister preetend they go shopping for cereal on their tricycles. (Expressive--Role Play)

c) S plays pool with M, taking turns hitting the ball with the cue. (Fine Motor Learning)

12. Unspecific

This Activity encompasses the pass-time or purposeless behavior of the child, and all other activities or behaviors which cannot be coded in the other contexts because of unspecified situations, ambiguity of behavior or unclear protocol. . Some examples typifying this are:

a) S wanders around aimlessly, then sits down with a blank look on her face. M asks: "What are you going to do?" (Purposeless Behavior)

b) M calls S and says: "Let's go downstairs." S complies. (Unspecific situation)

c) S babbles something to M. M looks at S. S walks away. (Ambiguity of Behavior)

d) S whispers something in M's ear. M whispers back--observer can't hear what they say. (Unclear Protocol)

31. Emotional and Social Expression--Positive

This Activity indicates that the main focus of the child is the expression of positive emotional feelings, such as affection, joy, pleasure, and contentment; or gestures of social kindness such as respect, thoughtfulness, empathy, sharing and offering help. Here, the child often demonstrates such feelings through facial expression, gestures or actions, such as smiles, kisses, jumping up and down for joy, offering help to someone, comforting someone who is crying; or he reveals his feelings by statements ("I love you, Mommy") or by verbalizing his concern ("Cookie for Jimmie [peer] too"). He may also engage in pleasure-seeking activities, such as being entertained, rough housing with someone, or playing spontaneous social games. These behaviors are often likely to be suggested or solicited by another person. The following are some common examples typifying this behavior for children age 1-3:

a) Father carries S in his arms, hugs and tickles S and playfully pretends to bite S's belly. S laughs.

b) S tells her brother: "Close your eyes." Her brother complies. S tickles her brother's eyelid. Her brother laughs and rolls over in the chair. S gets on top of her brother and they roll [illegible] and laugh together.

c) S'ssister makes funny faces at S. S laughs.

d) S offers her half-eaten banana to her brother who says "No" and shows S his own banana.

e) Peer crawls behind chair and gets stuck. Peer cries. S tries to pull peer's feet to get her out and calls M to help.

f) M pulls on a belt S is playing with and teases: "That's mine." S says "Mine". M echoes "Mine". S echoes "Mine". M and S chant "Mine" back and forth. (Verbal Game)

Exclusion:

a) S stands near M for her attention. (Seeking Attention--Neutral Social Behavior)

b) S and sister hold hands and try to do ballroom dancing. (Expressive--Adult Role)

c) S sits on babysitter's lap and they swing on the swing together. (Gross Motor Learning)

d) M gives S a lollipop. M says: "What do you say?" S says to M: "Thank you." (Socialization to Polite Forms--Neutral Social Behavior)

e) S and her sister play peek-a-boo behind a curtain. (Concrete Reasoning---Object Permanence)

f) S falls and cries. M holds S and pats his back. (Crying--Negative Emotional Behavior)

32. Emotional and Social Expression--Negative

This Activity indicates that the main focus of the child is the expression of negative emotional feelings, such as hostility, anger, sadness, distress, fear and jealousy or negative social behaviors such as aggression, tantrums, rejection of another, selfishness or destructiveness. Here, the child often demonstrates such feelings through facial expressions, gestures, or actions, such as an angry look, whining or crying, tantrums, hitting or pushing someone, throwing or destroying things; or he reveals such feelings by verbalizing how he feels ("I don't like you!" or "I am scared"). Some examples typifying this behavior for children age 1-3 are:

a) S bumps his head and cries. M picks S up and comforts him.

b) S snatches two bowling pins away from peer who protests. S runs away with the pins.

c) S hears a man with a deep voice on television. S tells M: "I am scared," and lays his head on M's lap.

d) S is crying. Brother goes to him. S shouts: "Go away." (Rejection)

e) S lies on the floor crying and kicking. M threatens to give S's bottle to her stuffed bear if S doesn't go upstairs for her nap. S cries, M carries S upstairs.

f) S's brother wouldn't give S his lollipop and ran out the door. M explains to S that it is her brother's candy. S pouts and tells M in an angry tone: "You hit me." M laughs and says: "No, I did not," and hugs S.

Exclusion:

a) Some visitors come into the house. S follows close behind and sucks his thumb. (Emotional Security--Neutral Emotional Behavior)

b) S hits her doll "for being naughty." M looks on and smiles. (Expressive--Role Play)

33. Emotional and Social Expression--Miscellaneous

This Activity indicates that the main focus of the child is the expression of emotional need for security, social contact, or attention; or the compliance with certain culturally prescribed neutral social behaviors such as gestures and modes of speech. Here, the child may be engaged in seeking for emotional reassurance by sucking his thumb, using a "security object," seeking attention or social contact as an end in itself, competing with others; or he may be involved in saying greetings or waving, addressing someone politely, using polite forms such as "thank you" and "please". These behaviors may be suggested by another person. The following are some examples typifying this behavior for children age 1-3:

a) S gets up from playing with cards and walks to the kitchen where M is working. M says: "I am here." S smiles and goes back to her cards in the dining room.

b) S walks near M who is busy helping S's sister with arithmetic problems. S pulls M's dress. M doesn't respond. S climbs on the table and throws sister's crayons at M and sister. M puts S down on the floor and tries to distract S with a puzzle.

c) S sucks his thumb. M saysL "Don't." S doesn't comply. M tries to shame him, saying, "Look at Joseph with his finger in his mouth. Laugh at him Ha, Ha." S continues sucking his thumb.

d) M is putting a bandage on S's brother's hurt finger. S shows M her finger and says: "Boo-boo, too." M looks and says: "No, there is no boo-boo." S asks for a bandage. M says: "No, you can't have any." M leaves the room.

e) S sits in the playpen and babbles to M. M looks up at S and says "Hi."

Exclusion:

a) S goes into the kitchen and asks M for a glass of water. (Basic Care)

b) S babbles to M who looks out from behind the newspaper and says "Hi, peek-a-boo." (Concrete Reasoning--Object Permanence)

c) M puts S in her crib for a nap. S sucks her thumb as she lies down. (Basic Care)

d) S picks up two crayons from the table where her sister and M are working. M takes the crayons back from S. (Play with Household Items--not S's playthings)

Dimension 2--Initiation Index

This dimension simply keeps track of who initiates an Activity:

1 = mother or the principal caretaker
2 = the subject child
3 = another adult (over 7 years of age)
4 = another child (for age 1 subject = 2-7 years; for age 2 subject = 4-7 years)
5 = peer (for age 1 subject = peer under 2 years; for age 2 subject = peer under 4 years)
0 = doesn't apply or don't know

The following are some examples:

a) S goes to pull a pillowcase (S initiates)

b) M offers S a cookie. S takes it. (M initiates)

c) Sib bounces her body to the music. S imitates. (Sib initiates)

Dimension 3--Encouragement Index

This dimension notes the other person's attitude concerning the child's behavior according to the following codes:

1 = the other person encourages the child's behavior
2 = the other person discourages the child's behavior
0 = the other person's attitude to the child's behavior is neutral

The following are some examples which illustrate the use of this dimension:

a) S goes to show M a spool of thread. M says "See" and demonstrates how to roll it on the floor. (M encourages play with household item by suggestion and demonstration)

b) Sib and S play tea party with a toy tea set. (Sib encourages role play by active participation)

c) S falls and cries. F picks S up and says: "Where is the doggie?" (F discourages crying by distraction)

d) S pulls at the cat. M says: "No, no. Be nice to the kitty." (M discourages S's behavior by restriction)

e) S puts a block under the door mat repeatedly. M peeks in briefly. (M is neutral toward S's play)

Dimension 4--Interaction Techniques

This dimension is an account of the techniques (or types of behavior) used by the other person when he is interacting with the child.

There are fifteen techniques distinguished in this Scale. Originally they were defined as the "Maternal Behavior Techniques," but subsequently have been modified and expanded to become "Interaction Techniques" which may be used by any other person: the mother, another adult, an older child, or a peer (playmate close in age). The fifteen interaction techniques are grouped into the following seven categories:

Category I: (Teaching)	21 = didactic teaching 25 = justification or statement of a rationale 40 = active participation
Category II: (Informing)	22 = general information giving
Category III: (Directive)	23 = suggestion or command 31 = positive reinforcement or affection 37 = focussing on a task

Category IV: (Restrictive)
24 = restriction or prohibition
32 = negative reinforcement or hostility
34 = distraction or ignoring
36 = refusal to help or comply

Category V: (Help)
35 = providing services or assistance

Category VI: (Preparatory)
38 = providing materials
39 = changing location

Category VII: (Neutral)
33 = observing or interpreting

These techniques will be defined and described with examples below:

#21. Didactic Teaching

This techinque indicates that the focal effort of the other person is to instruct the child. Teaching may be accomplished by labeling, reading, explaining, demonstrating, assessing what the child knows, providing feedback, imparting specific knowledge or relating experiences for the purpose of concept formation. Teaching is often proactive* and is always coded as encouraging (see the Encouragement Index, p. 18). The following are some common examples of this technique used with children age 1-3:

a) S and her sister are looking out at the window. Sister says: "See the doggie? Doggie. It goes bow-wow." (Labels and expands)

b) S points at a balloon on his pajamas and says "red". M corrects: "No, blue. It is a blue balloon." (Provides feedback)

c) M shows S how to hold a toy rolling pin to roll out playdough. (Demonstrates)

d) M reads a picture book to S. ". . . Good night room. Good night room. . .Good night cow jumping over the moon. . ." (Reads)

e) S has been pointing out a tiny mouse in the illustrations of a picture book. M turns to another page and asks: "Can you find the mouse here?"--It is imbedded in the details of the illustration. (Assesses S's spatial perception)

f) M, pouring some cold milk in S's soup, says: "The cold milk will cool off your hot soup." (Imparts facts about physical phenomenon)

#25. Justification or Statement of a Rationale

This technique indicates that the focal effort of the other person is to provide explanations or reasons to the child. He may make "because" statements, answer "why" questions; or he may provide justification to his directives or control over the child. It may be used in proactive or reactive situations, and may be either encouraging or discouraging with respect to the behavior of the child. The following are some common examples of this technique used with children age 1-3:

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*A "proactive" situation is one in which the other person is initiating an Activity. In a "reactive" situation the other person is responding to the child's behavior.

a) M tells S: "Put on your shoes; it is cold in here." (Justification for directive)

b) M cautions S: "Don't touch the iron. It is hot; you will get hurt." (Justification for restriction)

c) S asks: "Why Gary cries?" Brother answers: "Because he feels angry." (Gives reason)

d) M says: "If you don't go to bathroom now, you'll have to wait until we get to Janie's house." (Rationale for option)

#40. Active Participation

This technique indicates that the focal effort of the other person is to engage actively in behavior with the child. Another person may join in the child's play or tasks, dramatize for the child, or entertain him by rough-housing with him or through playful teasing. Usually this technique is used to promote the child's interests in tasks and his enjoyment of life. It may be used in proactive or reactive situations. The following are some common examples of this technique used with children age 1-3:

a) M and S are playing pool, taking turns to hit the balls. (Joins in play)

b) S hands diapers one by one to M for her to fold. (Includes S in household task)

c) S talks to sister on the play telephone and then they have a "tea party" with toy tea set. (Joins in role play)

d) Sister makes funny faces at S. S laughs. (Entertains S)

e) S and brother roll around and rough-house on the couch. (Social game)

f) Father tickles S and pretends to bite S's belly playfully. (Affectionate game)

g) S calls M's attention to her belt and says: "Mine, mine." M echoes "Mine". They chant "mine" back and forth and laugh. (Verbal game)

h) M imitates the roaring of a lion as part of a story she is reading to S. (Dramatizes)

i) S asks for milk. M teases by pretending to drink S's milk before handing it to S. (Playful teasing)

#22. General Information Giving

This technique indicates that the focal effort of the other person is to inform the child about routine matters. He may make comments on routine facts, such as "It is a nice sunny day"; or set rules, such as "We eat at the table"; or simply engage in low-level social conversation. This technique may be used in proactive or reactive situations and is usually neutral in tone. The following are some common examples used with children age 1-3:

a) Someone goes out the lobby door. S asks: "What, mommy?" M informs: "That was the store man. He just went out the door." (Statement of fact)

b) S pats a kitten. M says: "That is a nice little kitty." (Comments)

c) Sister tells S: "Mommy said we can't play at Daddy's desk."

d) Babysitter says: "It is almost time for Sesame Street." (Statement of future event)

e) M is dressing S for a birthday party, and chats: "Remember the birthday party you went to at Amy's house? There were lots of little children. You all had party hats on. . ." (Chatting about past experience)

#23. Suggestion or Command

This technique indicates that the focal effort of the other person is to direct the child to do a certain task, or to behave in a certain way. He may request, beg, urge, or command the child to do something; or he may suggest by a physical gesture such as handing a suggested toy to the child; or he may give the child a choice as in: "You want to drink juice or water?" This is an encouragement technique and is usually used in proactive situations. It may also be used in reactive situations when the other person consents to the child's request for permission. The following are some common examples of this technique for children age 1-3:

a) M says to S: "Will you pick up all the toys now?" (Requests)

b) M serves soup and says to S: "Please eat it all up. . .for Mommy." (Urges)

c) M yells at S: "Go out to play. Out!" (Orders)

d) Sister says to S: "Let's dance." (Suggests)

e) Sister hands a toy bottle to S and says: "You feed the baby." S pretends to feed her doll. (Physical suggestion and command)

f) Grandmother asks S: "Would you like to read Peter Rabbit or Curious George?" (Suggests reading by offering choice)

g) M asks S: "Will you get Mommy a tissue?" (Requests to do an errand)

h) S reaches for a hair brush. M says: "All right." (Permits)

i) S takes a book to M and says: "Read." M says: "OK." (Consents to reading)

#31. Positive Reinforcement or Affection

This technique indicates that hte focal effort of the other person is to actively promote the child's endeavours in an ongoing task or behavior; or to demonstrate his affection and liking for the child. He may encourage the child by praising, rewarding, or promising a reward (can be affection or material); by showing approval and pleasure; or by favorably comparing the child to others. He may express his liking for the child by demonstrating affection and enjoyment, or by verbal statements, such as "I like you". This technique is also used when the other person defends the child by protecting him against someone or something, or by making excuses for his behavior. This is an encouragement technique and is often used in reactive situations. The following are some common examples used with children age 1-3:

a) S does a somersault. Aunt claps her hadns and says: "Yea, yea!" (Praise)

b) S correctly fits a block into the shape-sorting box. M says: "Good for you, Brenda." (Verbal praise)

c) At lunch table, M says to S: "You eat up your sandwich and then I will give you a cookie and potato chips." (Promise of reward)

d) S carries a pile of folded clothes into brother's room for M. M hugs S and says: "Thank you." (Rewards with affection)

e) S walks around with a maple pod on her nose; peer chuckles. (Approval)

f) Father tosses S in the air and hugs and kisses S. (Affection)

g) S bumps his head and cries. M picks S up, rubs his head and pats him. (Comforts)

h) S tells M: "I love you, Mommy." M smiles: "I love you too." (Verbal affection)

i) S picks up a doll and sister tries to take it away. M moves S away from sister and tells her: "Let him play with the doll." (Defends)

#37. Focussing on Task

This technique is fairly self-explanatory. It indicates that the focal effort of the other person is to concentrate the child's interests and attention on an ongoing task. It is often in the form of a suggestion. It is an encouragement technique and is usually used in reactive situations. Some common examples are listed below:

a) S and M are reading a picture book. S is distracted by the fast moving advertisement on television. M saysL "Let's find out what happens to Curious George." S looks at the book. M continues reading the story.

b) S and sisters are fooling around at the lunch table. M says to them: "Eat your sandwiches."

c) S stacks rings then looks away. M puts another ring in S's hand. S stacks it on the cone. (Physical focussing)

#24. Restriction or Prohibition

This technique indicates that the focal effort of the other person is to verbally prohibit or restrict the child's behavior. He often states, and sometimes implies, "No's" and "Don't's". He may ask or beg the child not to do something or he may stronly prohibit the child. He may also refuse or postpone the child's request for permission. Usually this technique is used in reactive and restrictive situations, but sometimes it may also be used proactively in warning or cautioning circumstances, such as "Don't climb so high, or you'll fall." The following are some common examples used for children age 1-3:

a) S pulls out records from the hi-fi cabinet. M says: "No, Brenda." (Commands)

b) S chews on pen. M says: "You don't eat pens, young man." (Restricts by statement)

c) S fiddles with television knobs. M yells at S. "Stop fooling with the television." (Forceful command)

d) S says: "I am done," and starts to get down from his highchair. M says: "Wait, let me get your bib off first." (Implied "Don't get down yet" in "Wait")

e) S and sister are yelling. M says: "Please be quiet." (Implied "Don't be noisy")

f) S asks for milk, M says: "I will give you milk at bedtime." (Postponed permission)

g) S is climbing on a chair. M cautionsL "Be careful. That chair may tip." (Warning)

32. Negative Reinforcement

This technique indicates that the focal effort of the other person is to forcefully restrain the child's endeavour in a given ongoing task or behavior; or to express hostility or aggression to the child. He may attempt to stop the child by blocking or removing him from an activity; taking away the object he is involved with; punishing him by scolding, spanking, isolating, withholding privileges and the like; threatening to punish; employing harsh criticism; or expressing disapproval, displeasure or rejection. He may display his hostility toward the child by making pejorative or derogatory comments to him; assaulting him offensively; engaging in aggressive or defensive fights; teasing him maliciously; or showing dislike for him through rejection or avoidance. When the other person is an adult, this technique is usually used in reactive and restrictive situations. When the other person is a child, this technique may often be used in proactive situations. The following are common examples of this technique used with children age 1-3:

a) S mouths a matchbook. M takes it away. (Removes object)

b) S pokes his finger in an electric outlet. M moves S away from the outlet. (Removes child)

c) S bites M. M spanks S's hand and says "no" . (Spanks)

d) S gets into sister's bag again. M yells: "Go to your room." (Punishes by isolation)

e) S lies on the floor kicking and crying. M says: "If you don't stop now I am going to give your bottle to Teddy (bear)" (Threatens)

f) S soils her diapers. M yells at her: "You are a pig. Why didn't you tell me?". . ." (Makes pejorative remark)

g) S and other children are running around outside. Peer (age 5) pushes S down. (Assaults)

h) S tries to take his brother's dump truck. S's brother pushes him away. (Defensive fight)

i) Sister and her peer walk into sister's room with dolls. S tries to follow. Sister blocks S and shuts the door, saying "Not you." (Rejects)

j) S sucks his thumb. M shames S: "Look, look at Joseph with his finger in his mouth. Laugh at him, Ha-Ha!. . . Everybody come to look and laugh at Joseph. . ." (Derogatory remark)

#34. Distraction or Ignoring

This technique indicates that the focal effort of the other person is to divert the child's attention and interest from a given task or behavior to a more desirable task or behavior. He may do so by providing alternatives, by suggesting a new activity, or by talking about something else in order to distract the child. This technique is usually used in reactive and restrictive situations. It may also be used when the other person is obviously aware of the child's seeking for attention or approval, but deliberately ignores him in order to discourage such behavior, or because of other reason, such as being occupied in a phone conversation. The following are some common examples of this technique used with children age 1-3:

a) S whines. M distracts: "We are going bye-bye soon." (By talking about something else)

b) S tries to take sister's playplax. M distracts S with another playplax. (By providing substitute)

c) S pulls dish washer door up and down, repeatedly. M shows S a donut and tries to distract: "Want a donut, Scott?" S ignores M. (By suggesting new activity)

d) S asks M for soda. M says: "How about some milk instead?" (By suggesting alternative)

e) M has refused to give a bandage to S, who says she has a cut on her finger. S follows M to kitchen and insists that she has a "boo-boo" on her finger. M ignores S. (By deliberately ignoring her request)

f) S calls M and then stands near to M when M does not respond. M is busy talking on the phone. (Because of preoccupied situation)

#36. Refusal to Help or Comply

This technique indicates that the focal effort of the other person is to discourage the child's request for help by refusing it, by postponing it to a later time, or by suggesting that someone else help. Here, the motive is not necessarily discouragement of the child in a given task, but may be inconvenience to the other person at the time of the request, or a desire for the child to help himself. Nevertheless, it has a discouraging tone at the time it is used. This technique may also be used when the other person refuses to comply to the child's directives or demands and in that way restricts him. It is usually used in reactive situations. The following are some common examples of this technique used with children age 1-3:

a) S tries to spin a top, and goes to sister for help (she helped S before). Sister says "uh-uh" (no) and runs out to the telephone which is ringing. (Refuses help--because of inconvenience)

b) S goes to show M a match-box truck with a broken door. M is busy with laundry and says to S: "I'll fix it for you later." (Postpones help)

c) S, riding on a tricycle, approaches a downhill slope and calls to

M for help. M says: "You can do it. Use your feet and go down slowly." (Refuses help--in order to encourage S to help himself)

d) S tries to unwrap a piece of candy and goes to M for help. M is busy and says: "Ask Mary to help you." (Suggests that someone else help)

e) S tries to open the door to sib's room (sib and peer are playing inside and don't want S to go in). S looks to M and babbles as she tries to turn the door knob. M shakes her head and says: "No, Brenda, I can't help you." (Refuses help)

f) S demands to go out and tries to put on his jacket. S goes to M for help with his jacket. M shakes her head. (Refuses to comply)

#35. Providing Service and Assistance

This technique indicates that the focal effort of the other person is to offer or perform services for the child; or to assist him when he is in difficulty. This is usually an encouragement technique and may be used in proactive or reactive situations. It may also be used when the other person yields unwillingly to the child's demands. In such cases, it is a technique of "giving-in." The following are some common examples of this technique used with children age 1-3:

a) M diapers and dresses S. (Provides service)

b) S is struggling to eat some soup with a spoon. M says: "Want Mommy to feed you?" (Offers service)

c) Babysitter pushes S on the swing. (Provides service)

d) S is working on a puzzle and has some trouble fitting a piece in. Visiting adult who has been looking on, turns the puzzle piece around and places it right next to where it should go. (Provides help)

e) S tries to reach for a toy car on the table. M hands it to S. (Provides help. Note: If M initiates this, it would be coded as physical suggestion)

f) S struggles to push a stroller up a slope. M asks: "Want Mommy to help?" (Offers assistance)

g) M has refused S's request to reach toy, but S keeps whining for toy. M gives in and hands S the toy. (Yields to S's demand)

#38. Providing Materials

This technique indicates that the focal effort of the other person is to prepare the child for a given activity by providing materials or setting up the activity. Usually this is an encouragement technique and may be used in proactive or reactive situations. The following are some common examples used with children age 1-3:

a) M puts a peg-board set on the table, and gets S settled in the chair to play with it. (Prepares for play)

b) S asks for milk, M pours milk in a glass and hands it to S. (Provides food)

c) Sister, who has suggested playing with carriage, gets the carriage out for S. (Prepares for play)

d) M gets S ready for her nap by putting a blanket on S, handing S her bottle and pulling down the shades. (Prepares for nap time)

#39. Changing Location

This technique is also self-explanatory. Its focal effort is to change the child's location. The other person may suggest that the child move or he may carry or lead him. Often it is used in proactive situations. It may be an encouragement technique in preparing for a desired activity, it may be for the convenience fo the other person, ot it may be for reasons unclear to the observer. (Note: If M changes S's location in order to terminate an undesired activity or behavior, then it would be coded as negative reinforcement--to remove child). The following are some common examples of this technique used for children age 1-3:

a) M takes S out of his jumper chair and puts S on the floor. (Transports S)

b) S goes to M and says "pee-pee". M rushes S to the bathroom. (Leads to another location)

c) M calls S: "Come on, Jackie, we are going inside (the house)." (Suggestion for change of location)

d) S is playing outdoors with sibs and peers. M calls S from inside: "Go play in the backyard." (Change of location for play)

e) M carries S to her room to put S down for a nap. (Transport S)

f) Sister whispers something to S, then takes S's hand and leads him to the parlor. (Leads to another location)

#33. Observing/ interpreting

This technique indicates that the focal effort of the other person is to attend to the child by observing him, checking up on him, listening to him; or by trying to interpret what he wants, what he says, or how he feels. This technique is usually used in reactive situations and is usually neutral in tone. The following are some common examples of this technique used with children age 1-3:

a) S is drinking his bottle. M peeks in then leaves. (Checks in)

b) M watches S who is playing with nut shells. (Observes)

c) M listens to S who says: "I am scared of the man (on television)" (Listens)

d) S tries to open food cabinet door. M questions: "What do you want? Strawberry?" (Interpretes what S wants)

e) S whines and rubs her eyes. M questions: "Are you tired and sleepy?" (Interpretes how S feels)

f) S says to M: "Up, up." M questions "What is up?" S says: "Lady up"--referring to the observer who has followed S upstairs. (Questions what S says)

g) S comes out from the bathroom and says to M : "Pants up." M is puzzled: "Your pants are up. What do you want?" S says: "Pee-pee." M says: "Oh! You meant pants down!" and rushes S to the bathroom. (Questions what S wants)

h) S comes back from putting a shirt away for M. M questions: "Did you put it in the dresser?" S nods. (Checks up on S)

Dimension 5--Compliance Index

The child's response to a directive or restrictive technique is noted according to the following codes:

1 = S complies
2 = S does not comply
0 = not relevant or unknown

PART II: CODING STEPS AND GUIDELINES

Recording Raw Data

This scale is applied to continuous dictated observational records. The observer follows the subject child with a small portable tape recorder and a stop watch. He times and records the child's behavior and surrounding events, in a way similar to a commentator who reports a ball game. For each 10 minute observation protocol (or observational record), the observer also notes the following background information:

1. the subject child's identification code and age (number of days from the first birthday)
2. observation and protocol number, and observer code
3. date and time (rounded to the nearest hours)
4. weather and temperature
5. place (indoor, outdoor, or mixed)
6. principal care-taker
7. people present
8. television or radio program, or type of records being played, if any

For each observation, 3 continuous observational records (with a 10 minutes break following each) are taken. The first and last records are then coded directly from the tape, and the second one is coded from a written transcription.

Coding Steps

1. Fill in the background information for each 10 minute observation protocol on the coding sheet.

2. From the taped dictated record or its transcript, time exactly the duration of each interaction between the subject child and another person which occurs in the context of a distinct Activity. The duration of an interaction comprises the basic coding unit.

   a) S pulls the wastebasket (0:00-0:03 sec.), then touches the hot oven; M says "No, don't touch it" (0:03-0:11 sec.), S complies. (Here, the interaction duration 0:03-0:11 is the coding unit)

   b) M reads a picture book to S (0:00-0:58 sec.), then M and S look for the embedded mouse in the illustration (0:58-1:20 sec.). (Here, the Activity duration for reading 0:00-0:58 is one unit; the Activity duration for spatial learning 0:58-1:20 is another unit)

   The duration of a given unit is recorded in two ways. The first is to note the time as closely as possible as in the examples above. The duration is also recorded by rounding off the time to the nearest five second intervals. Thus, in example a) above the exact duration is 8 seconds (time 0:03-0:11) and the rounded off duration is 5 seconds (time 0:05-0:10).

3. For each coding unit, note the person who is interacting with the child. Interactions are classified according to the following five types on the basis of the particular person involved in the interaction.

   1 = mother
   2 = the subject child only
   3 = another adult (over 7 years of age)
   4 = another child (for age 1 subjects = 2-7 years; for age 2 subjects = 4-7 years)
   5 = peer (for age 1 subjects = peer under 2 years; for age 2 subjects = peer under 4 years)

   These types of interaction are defined below:

   1) Mother: This refers to the principal caretaker, usually the mother, who has the primary responsibility caring for the child during a given observation.

   2) Subject: This refers to the subject child who is being observed. (See step 8 for special cases of coding subject child's behavior when he is alone.)

   3) Another Adult: This refers to any person who is not the principal caretaker and who is over 7 years of age. It could be the father, a grandparent, another adult male or female, a sibling or peer who is 7 or older. This could also be the mother when she is not the principal caretaker in a given observation.

   4) Another Child: This refers to another child who is not the principal caretaker; and who is between 2 and 7 years of age for subjects age 1, and 4 and 7 years of age for subjects age 2. It could be a sibling, a playmate, or someone who happens to come into contact with the subject.

   5) Peer: This refers to another child who is close in age with subject--less than two years of age for subjects age 1, and less than four years of age for subjects age 2; and who is not the principal caretaker of the subject child. It could be a sibling or a playmate or anyone who comes into contact with the subject.

   In the case when there is more than 1 person interacting with the child, use the above arrangement as a hierarchy. Thus, Type 1 will take precedence over Type 3, Type 3 over Type 4, Type 4 over Type 5.

4. Once the duration of the coding unit and the type of interaction is decided, enter the Activity code in the appropriate type column on the coding sheet. Then code horizontally the other dimensions: the Initiation Index, the Encouragement Index, the Technique used by the other person, and the subject child's compliance to it (if relevant).

   e.g. M suggests: "Let's read Good Night Moon." S complies.

Act.	Init.	Enc.	Tech.	Compl.
1	1	1	23	1

Here the Activity is reading, initiated by M, who encourages with suggestion, and S complies.

5. If more than one technique is used, list the several techniques as they first occur. Fill in the other dimensions for each technique listed, so there may be several coding statements for the same Activity.

   e.g. M reads "Good Night Moon" to S and dramatizes.

Act.	Init.	Enc.	Tech.	Compl.	Coding Statement
1	1	1	21	0	1
1	1	1	40	0	2

6. When more than one coding statement is used in a given unit, choose a summary coding statement by selecting the coding statement which contains the predominant technique (usually the one having the longest duration within the interaction). Thus, the above example may be:

Act.	Init.	Enc.	Tech.	Compl.	Coding Statement
1	1	1	21	0	1 - 1 (summary code = 1)
1	1	1	40	0	2 - 0 (secondary code = 0)

   For most analyses, the summary code is used to represent the entire coding unit, e.g., the technique in the summary statement is considered to have lasted for the entire duration of that interaction. It is indicated by an "1" following the coding statement number. All secondary codes are indicated by "0".

7. If no one technique is predominant in an interaction unit which includes several techniques which are in the same class, add a summary coding statement and use the code for the class in the technique column. Thus, the above example may be:

e.g.	Act.	Init.	Enc.	Tech.	Compl.	Coding Statement
	1	1	1	21	0	1 - 0
	1	1	1	41	0	2 - 0
	1	1	1	01	0	0 - 1 (summary code)

8. For "Type 2 Interaction" (the subject child), the child is actually alone, and there is no interaction with another person. It is used to record those behavior of the child which fall into Activity Category #2 (Spatial and Fine Motor Learning) and Activity Category #3 (Concrete Reasoning). We have a special interest to learn more about these two types of Activities in the intellectual development of children age 1-3, and for this reason we keep an account of these two Activities as they occur, even if the child is alone. Only the Activity dimension is coded here. For Activity Category #3, the sub-categories are also coded, immediately following the Activity.

   e.g. S fits puzzle pieces.

Act.	Sub-Category	Coding Statement
2	0	1 - 1

e.g. S looks at his own reflection in a mirror.

Act.	Sub-Category	Coding Statement
3	3	1 - 1

Phase Rule in a Given Activity

A long Activity episode may have 2 or more distinguishable phases. These phases are coded separately, providing that within each phase, a given technique or a different initiation lasts 15 seconds or more. The several phases of a long Activity episode are timed separately and each has its own summary coding statement.

The following is an example of a long Activity episode with several phases and their corresponding codes and summary statements:

Time	Activity Episode	Phase	Act.	Init.	Enc.	Tech.	Compl.	Coding Statement
0:00-0:05	M:"Let's read a story" S complies	.	1	1	1	23	1	1 - 0
0:05-0:20	M & S find a book, then get settled in couch	I 20 sec.	1	1	1	38	0	2 - 1
0:20-1:00	M reads and labels	II 40 sec.	1	1	1	21	0	1 - 1
1:00-1:10	S looks away, M focuses S on the book	III 30 sec.	1	2	1	37	0	1 - 0
1:10-1:40	M reads and labels and dramatizes		1	1	1	21	0	2 - 0
			1	1	1	40	0	3 - 0
			1	1	1	01	0	0 - 1
1:40-1:45	S labels, M praises	IV 15 sec.	1	1	1	31	0	1 - 1
1:45-1:55	S looks at pictures, M looks on and smiles		1	1	0	33	0	2 - 0
1:55-2:00	S points at bookcase and says:"Put it away"	15 sec.	5	2	1	23	0	1 - 0
2:00-2:10	M lifts S up, S puts the book on the bookcase		5	2	1	35	0	2 - 1

Other Guidelines

1. Intermittent Interaction. If the interval between 2 interactions focussed

on the same Activity is more than 15 seconds, code the two interactions separately. If the interval is less than 15 seconds, code the sequence as one continuous interaction.

e.g. 0:00-0:10 M reads a picture book to S
0:10-0:30 M attends to baby sib
0:30-0:55 M reads to S
0:55-1:00 M attends to baby sib
1:00-1:35 M reads to S

Here, the Activity is reading, and there are 2 intervals in which M attends to the baby. The first separates the Activity of reading by 20 seconds, and the second by 5 seconds. Thus, for the latter case, 2 interactions are coded for the Activity of reading:

0:00-0:10 Activity #1
0:10-0:30 No interaction
0:30-1:35 Activity #1

2. Interruption. If an interruption in the form of interaction within a different Activity context occurs and lasts 15 seconds or longer, time and code the interruption as a separate interaction. If the interruption lasts less than 15 seconds code the sequence as one continuous Activity, omitting the coding which would apply to the interrupted interaction.

e.g. 0:00-1:10 M reads a picture book to S
1:00-1:20 M and S look for the embedded mouse in the illustrations
1:20-2:00 M continues reading to S

Here, the focal Activity is reading and the interruption is an Activity of spatial learning. Since the interruption lasts 20 seconds, it will be coded separately.

0:00-1:00 Activity #1
1:00-1:20 Activity #2
1:20-2:00 Activity #1

If the Activity of looking for the embedded mouse lasts less than 15 seconds, the entire sequence will be coded as one continuous reading Activity.

0:00-2:00 Activity #1

3. Directive and Restrictive Techniques. When a directive or a restrictive technique (#23, 24, 32, or 34) appears in a focal Activity more than once, code each occurence separately only if there were different outcomes as indicated in the compliance dimension.

e.g. Sib suggests play "going to the grocery store." S says "No".
Sib suggests play "going to a picnic." S complies.

Act.	Init.	Enc.	Tech.	Compl.
4	1	1	23	2
4	1	1	23	1

Here, the Activity is imaginative play, and there are 2 suggestions, with different outcomes. Thus, both will be coded. (If S complies to both sug-suggestions, then only Technique #23 with a positive outcome will be coded)

4. Repetition of Techniques #23 or #24. If Technique #23 or #24 is repeated before S responds to it, the repetition of the technique is not coded. If Technique #23 with a positive outcome is repeated, code the repetition as a focusing technique (#37).

e.g. S chews on a pen. M says"Don't." S looks at M with pencil in his mouth. M repeats: "You don't eat pen, young man." S takes the pen out of his mouth.

Act.	Init.	Enc.	Tech.	Compl.
6	2	2	24	1

Here, the Activity is play with household item, and M discourages it by restriction which is repeated before S responds to it with compliance.

e.g. Sib (age 6) says: "Let's dance." Sib and S stand facing each other and holding hands--in the position for ballroom dancing. Sib repeats: "Let's dance," they start to dance.

Act.	Init.	Enc.	Tech.	Compl.
4	4	1	23	1
4	4	1	37	1

Here, the Activity is adult role play. Sib repeats the suggestion after S agrees to it, so the repetition is coded as focusing (Technique #37).

5. Unclear Compliance to Directive or Restrictive Technique. In the case when S reacts to the directive or restrictive technique in contradictory ways by a) contradiction between verbal response and action, or b) contradiction over time within a given coding unit, code an action rather than a verbal response, and a positive rather than negative response.

e.g. S climbs on the banister on the stairs. M tells S to get down. S says "No," but comes down. (Here, S complies in action, and compliance will be coded as his response to the restrictive technique)

e.g. M suggests ginger ale for S. S says "No," but then changes her mind. M hands the cup to S. (Here, the positive response for compliance will be coded)

6. Unclear behavior of S. When the subject child's unclear behavior in an interaction becomes clear later on, code it as it is coded later.

e.g. S opens the kitchen cabinet door. M asks: "What are you doing? Want a cracker?" S nods. M gets a cracker for S.

Act.	Init.	Enc.	Tech.	Compl.
10	2	0	33	0
10	2	1	38	0

Here, M questions the unclear behavior of the child in the beginning of the interaction, then provides food for S. The entire interaction is coded as Activity 10 (Basic Care).

7. Overlapping Interaction. When more than 1 person is interacting with the subject child simultaneously or intermittently, code the person who is ranked higher (see the listing on p.30). If the persons are in the same group (or Type), code the behavior of the person who interacts most with the child.

e.g. M dresses S. F comes to help.

Here, the mother, who is in Type 1 interaction, is coded; the father, who is in Type 3, will not be coded.

e.g. Sister (age 9) is labeling pictures in a book for S. Another sister (age 10) joins in briefly and praises S.

Here, both sisters are in Type 3 interaction. The behavior of the first sister who is the principal person interacting with the child will be coded, and the other will not be coded.

SAMPLE PROTOCOL, coded directly from taped continuous record

Subject ____ ____ Date 3/16/71 Time 10:35 Observer ____ ____ Observation # 11 Protocol # 33

Code 1-9 ID ____ ____ 11 Observer 2 12-13 Observation # 11 14 Phase 3 15-17 Days 369 18-19 Prot. # 33 21-22 Time 11

23 Weather: 1=snow 2=rain/unsettled [✓ 3=fine] 24 Temperature: 1=cold [✓ 2=mild] 3=hot 25 Place 1=outdoor [✓ 2=indoor] 3=mixed

27 Caretaker: [✓ 1=M] 2=F 3=other>7, Who? ____ 4=Child. Who? ____ 5=peer. Who? ____ 0= none.

28 Other>7 present [✓ 0=no] 2=yes, no interaction 3=yes, interaction. Who? ____

29 Other child present 0=no 2=yes, no interaction [✓ 4=yes,] interaction. Who? Sister (age 4½)

30 Other peer present: [✓ 0=no] 2=yes, no interaction 5=yes, interaction. Who? ____

31 TV, Radio on: [✓ 0=no] 2=yes, not attended to 3=yes, attended to. Program? ____

REMARKS:

			(1) MOTHER	(3) OTHER > 7	(4) CHILD 1=2-7 2=4-7	(5) PEER 1= < 2 2= < 4	(2) SELF(Piaget)	
34-35	37-39	41-43	45 - 54	45 - 54	45 - 54	45 - 54	45 - 54	NOTE
Int. #	Exact Time	Rounded Time	Ty C I E T S # M	Ty C I E T S # M	Ty C I E T S # M	Ty C I E T S # M	Ty C Cat. # S # M	
	0:08-0:15	0:10-0:15	1 0 9 1 1 2 2 0 1 1					M informs S that she has to go downstairs to do laundry
	0:15-0:22	0:15-0:20					2 0 3 0 3 - - - 1 1	S winds up music box
	0:22-0:54	0:20-0:55					2 0 2 - - - - - 1 1	S opens & shuts the door of a toy box
	1:05-1:10	1:05-1:10					2 0 3 0 5 - - - 1 1	S dumps small wooden figures out of toy box
	4:44-4:48	4:45-4:50			4 3 2 2 2 3 2 1 1 1			S turns a postcard – sib grabs it back.
	4:52-5:03	4:50-5:05	1 3 2 2 2 3 4 1 1 1					Screes. M says "Here's one for you" & gives
			1 3 2 2 2 3 8 0 2 0					S another postcard & S stops crying

SAMPLE PROTOCOL p. 2

II

			(1) MOTHER								(3) OTHER								(4) CHILD 1=2-7 2=4-7								(5) PEER 1=<2 2=<4								(2) SELF(Piaget)							
-35	37-39	41-43	45 - 54								45 - 54								45 - 54								45 - 54								45 - 54							NOTE
	Exact Time'	Rounded Time	Ty	C	I	E	T	3	#	M	Ty	C	I	E	T	3	#	M	Ty	C	I	E	T	3	#	M	Ty	C	I	E	T	3	#	M	Ty	C	Cnt	∅	3	#	M	
	5:19-45	5:20-5:45	1	10	1	1	35	0	1	1																																M wipes S nose & M suggests blanket + [illegible]
			1	10	1	1	23	1	2	0																																S says "NO", then reaches for blanket.
	5:45-6:09	5:45-6:10	1	10	1	1	31	0	1	0																																M puts S on her lap,
			1	10	1	1	35	0	2	1																																holds the cup for S to drink.
	6:10-6:27	6:10-6:25	1	01	1	1	23	1	1	1																																M suggests reading a story
			1	01	1	1	33	0	1	0																																S goes to get a book as M looks on.
	6:27-6:39	6:25-6:40	1	10	2	1	33	0	1	0																																S wants more drinks & hands cup to M
			1	10	2	1	35	0	2	1																																M questions & holds cup for S to drink.
	6:56-7:11	6:50-7:10	1	01	1	1	38	0	1	1																																M & S get settled in chair for reading story.
	7:11-7:44	7:10-7:45	1	01	2	1	21	0	1	1																																S questions "Moon". M labels "moon" & "balloons".
	7:44-9:30	7:45-9:30	1	01	1	1	21	0	1	1																																M reads the story "Good-
			1	01	1	1	40	0	2	0																																night Moon" & dramatizes
	9:30-9:45	9:30-9:45	1	02	1	1	23	1	1	1																																M suggests S look for the
			1	02	1	1	33	0	2	0																																imbedded mouse in the illus.
	9:45-10:20	9:45-10:00	1	01	1	1	21	0	1	0																																M resumes reading story &
			1	01	1	1	40	0	2	0																																dramatizes squeak of mouse.
			1	01	1	1	02	0	0	1																																

RELIABILITY STUDIES

Two reliability studies were conducted. The first was done before the study reported in this book was undertaken, and was limited to the Activity dimension of the Human Interaction Scale. The second was done after the study was in progress and included all five dimensions of the scale.

Study Number 1 Procedure. The children who participated in this reliability study were five one-year-olds (2 girls and 3 boys ranging from 11 to 16 months), and seven two-year-olds (3 girls and 4 boys ranging from 25 to 28 months). Each child was visited by one of four pairs of observers who observed him for three 5 minute sessions. Each five-minute observation was timed and taped simultaneously by the pair of observers, and was later coded independently. Percent of coding agreement by the paired observers was calculated for each protocol in the following two ways:

1) Protocol Agreement. Total seconds of coding agreement including time in which no interaction is taking place.

2) Interaction Agreement. Total seconds of coding agreement excluding time in which no interaction is taking place. Disagreement is counted when observer 1 and observer 2 code the same interaction differently or when one codes an interaction and the other does not. Three steps were followed in calculating interaction agreement:

a) the timing of each interaction was rounded to the nearest 5-second intervals
b) a 5-second "displacement" in timing was allowed
c) momentary interactions which lasted less than 3 seconds were considered as lasting 5 seconds

The following is an example of how these steps are applied:

	Obs. 1	Obs. 2
Interaction time	3:34-3:36	3:30-3:32
Expanded to 5-second duration	3:34-3:39	3:30-3:35
After Rounding	3:35-3:40	3:30-3:35
After Displacement	3:30-3:35	3:30-3:35

In this example the actual duration of the momentary interaction is 2 seconds. However, for purposes of reliability calculations it is expanded to 5 seconds. Then the timing is rounded to the nearest 5-second intervals. Finally the displacement rule is applied for adjusting the clocked timing of the interaction. Thus, depending on whether or not the observers agree on the coding for the Activity, their total agreement or disagreement time is five seconds for the above example.

Results. For the 1-2-year-olds, agreement calculated over total observation time was high -- being 85%, 85% and 82%, with an average agreement of 84%. Reliability based on interaction-time only was lower, but still acceptable, relative to standards of other comparable studies. The weighted average was 54%, 82% and 84% with an overall agreement of 73%. Results for the 2-3-year-olds were very similar to those for the 1-3-year-olds. Agreement on total observation time was 85%, 83%, and 85% with an average agreement of 84%, while the weighted average for agreement on interaction time only was 84%, 80% and 73% with an overall agreement of 79%.

It should be noted that in most cases low agreement occurred when the proportion of interaction time in an observation was low This may probably be explained by the fact that protocols with short interaction times tended to contain a higher number of small units which increased the possibility of error from overload. Also, with small units, it is usually more difficult for the observer-coder to define the Activity due to its momentary nature.

Study Number 2 Procedure. Six children were involved in the second reliability study, three 1-year-olds and three 2-year-olds. Three ten-minute observations were made on each child.

The procedure differed from that of study Number 1 in that agreement was checked for each of the dimensions of the Human Interaction Scale: Activity, Initiation, Encouragement, Technique and Success in Control, not just for the Activity dimensions alone. Also, instead of checking agreement on a statement-by-statement basis, each observer's total for each item cluster of a dimension was compared to the other observer's total. Thus, if observer 1 coded 100 seconds spent on highly intellectual activities in a given set of three 10-minute observations on one child, and the other observer coded 80 seconds on highly intellectual activities, then item agreement was calculated as 80% (80/100). Average agreements on each item-cluster or on single items where appropriate was then calculated by averaging over observer pairs. Agreement for each dimension as a whole was calculated by averaging agreement over individual items or clusters and over observer-pairs.

Results. Findings from this study are given in the Table below. The Table shows that agreement for each of the five dimensions was 86% for Activities, 78% for Initiation, 85% for Encouragement, 76% for Techniques and 87% for Success in control. Details of agreement for specific items or item-clusters may be found in the table.

Average Agreement on all Dimensions of the Human Interaction Scale

	Interact[illegible]	Activity	Initiation	Encouragement	Technique	Success in Control
Mean	95	86	78	85	76	87
Range	80-100	78-95	57-98	78-95	71-79	68-93
Median	95	84	89	85	77	91

Average Agreement on Specific Items of Each Dimension

	Activity			Initiation		Encouragement[a]		
	Highly Intel-lectual	Moderately Intel-lectual	Non-intel lectual	Mother	Subject	Encourages	Discourages	Neutral
Mean	89	88	82	85	72	93	52	74
Range	73-95	76-97	10-100	52-100	42-96	82-99	0-75	30-97
Median	90	88	76	94	87	95	36	77

	Techniques						
	Involvement	Information	Direct	Restrictive	Help[b]	Preparation	Observation
Mean	83	89	82	65	78	60	67
Range	38-100	0-100	70-91	0-92	45-90	0-79	46-92
Median	85	92	84	50	64	46	76

	Success in Control		
	Yes	No	Don't Know
Mean	77	66	91
Range	48-99	0-100	75-96
Median	78	59	95

[a] Most errors were in judging "discouragement" versus "neutral" categories.

[b] Most errors were in judging "help" versus "preparation" categories.

OBJECT INTERACTION SCALE *

Preliminary Manual

I. Introduction

II. Definition of Dimensions

III. Coding Guidelines

Reliability Check

---

*This Scale was developed by: Jean Carew Watts (Project Director) Itty Chan Barnett (Assistant Director), Nancy Apfel, Christine Halfar, and Geraldine Kearse (former staff member)

PRELIMINARY MANUAL FOR OBJECT INTERACTION SCALE

I. Introduction

This scale assesses the subject child's interaction with the material aspects of his environment. At present, it is being refined and expanded for a more detailed and complete assessment of the child's use of his environment.

This is a preliminary manual. It contains the following dimensions:

(1) Room

(2) Restriction

(3) Human Stimulus

(4) Object Stimulus

(5) Description of Object Quality

(6) Description of the Child's Activity

The first four dimensions were used in the preliminary data analysis (p.   ), and they will be defined and discussed in the following pages. The last two dimensions are being expanded and are not included in the data anlysis.

II. Definition of Dimensions

Dimension 1--Room

This dimension notes the room occupied by the child:

1 = living room

2 = dining room

3 = kitchen, including pantry and breakfast area

4 = playroom

5 = the child's bedroom

6 = other bedroom

8 = stair or hall

9 = study

10 = den, sunroom, or inside porch

11 = balcony or outside porch

12 = basement or attic

13 = public place--indoors

99 = open air

Dimension 2--Restriction

This dimension notes the barriers and restrictions imposed upon the child:

0 = not restricted

1 = restricted to crib

2 = restricted to highchair, car seat, etc.

3 = restricted to playpen (also car ride, etc.)

4 = physical restraint, such as being held and carried

5 = psychological restraint, such as "Eat in the dining room or kitchen , not in the living room."

Dimension 3--Human Stimulus

This dimension notes the person whom is attended to by the subject child. The person is coded according to the following categories:

1 = mother or principal caretaker

2 = the subject child

3 = another adult (over 7 years of age)

4 = another child (for age 1 subjects = 2-7 years; for age 2 subjects = 4-7 years)

5 = peer (for age 1 subjects = peer is under 2 years; for age 2 subjects = peer is under 4 years)

6 = television

9 = observer

The person categories are defined below:

1) Mother: This refers to the principal caretaker, usually the mother, who has the primary responsibility of caring for the child during a given observation.

2) Subject: This refers to the subject child who is being observed when he is attending to his own body.

3) Another Adult: This refers to any person who is not the principal caretaker and who is over seven years of age. It could be the father, a grandparent,

another adult male or female, a sibling or peer who is seven or older. This could also be the mother when she is not the principal caretaker in a given observation.

4) Another Child: This refers to another child who is not the principal caretaker and who is between two and seven years of age for subjects age one, and between four and seven years of age for subjects age two. It could be a sibling, a playmate, or someone else who happens to come into contact with the subject.

5) Peer: This refers to another child who is close in age to the subject--less than two years of age for subjects age one, and less than four years of age for subjects age two--and who is not the principal caretaker of the subject child. It could be a sibling or a playmate or anyone who comes into contact with the subject.

Dimension 4--Object Stimulus

This dimension notes the size of the object which is attended to by the subject child, and its portability for the child:

1 = small, portable object

2 = small, non-portable object

3 = large, portable object

4 = large, non-portable object

III. Coding Guidelines

This scale is based on a fifteen-second unit time sampling. The observer using a stop watch observes the child's interaction with his surroundings for fifteen seconds and then for the next fifteen seconds the observer codes or records on the coding sheet information pertaining to the six dimensions. Each observed fifteen seconds is a unit. There are twenty units in each ten-minute protocol.

For each fifteen-second unit, code directly or describe the following dimensions:

1) Room: Code according to the location of S in a given unit. If there is more than one, code the room in which the child spends the longest time.

e.g., S walks out of kitchen and goes to look for a toy in the living room.

Here, the child's presence in the living room is of a longer duration and hence will be coded. Kitchen will not be coded.

2) Restriction: Code according to the restriction used.

If there is a change in restriction, code the restriction having the longest duration in the unit.

e.g., M takes S out of the playpen, S crawls around on the floor.

Here, absence of restriction (0) has the longer duration and hence no restriction will be coded. Restriction in the playpen (3) will not be coded.

3) Human Stimulus: Note the person or persons attended to by the subject in a given unit. If the child attends to more than one category of person, code each category. If the child attends to none, use "0" code.

e.g., S is at the lunch table, and looks on as sister (age six) hands her a spoon and M serves hot soup in her bowl.

Here, both the sister (category 4) and the mother (category 1) will be coded in the same unit.

4) Object Stimulus: Note the object(s) attended to by the subject child in a given unit. If the child attends to more than one object and they are in different categories in terms of size and portability, code each

category. If the child attends to none, indicate so with "0" code.

e.g., S scribbles on the bookcase with a crayon.

Here, both the large, non-portable bookcase (4) and the small, portable crayon (1) will be coded in the same unit.

5) Description of Object: Describe in as much detail as possible the properties and nature of the material object(s) attended to by the subject child in the fifteen-second unit.

6) Description of the Child's Activity: Describe in as much detail as possible the child's interaction with his surroundings in the fifteen-second unit.

RELIABILITY CHECK

In February, 1970, a simple reliability check on this preliminary scale was conducted by two pairs of observers. Each pair of observers noted and coded the four dimensions (Room,Restriction, Human Stimulus, and Object Stimulus) in three ten-minute observational protocols. Agreement was checked by simply noting whether or not both observers in each pair agreed on the codes in a given unit. The resulting agreement between observers was close to 100% for each of the above dimensions.

TYPICAL DAY OF THE WEEK. TAPE THIS SECTION

A. I'd like you to tell me as much as possible about your activities and those of X yesterday. We have found that we can learn a great deal about a child if we follow his activities closely for one whole day. It will also help us choose the most convenient time to visit your house. So try to remember everything you and X did yesterday starting from about this time yesterday to the time X went to bed and from the time he got up this morning to now. Take it hour by hour and try to remember.

Time	Where was X?	With Whom?	What was X doing?	Where were you?

TYPICAL DAY OF THE WEEK. (Cont'd)

Time	Where was X?	With whom?	What was X doing?	Where were you?

B. Would you say yesterday was a pretty typical day for X?

____

C. When did X spend time with his father yesterday ?______________

What were they doing? ______________________________

D. When did X spend time with his sister(s) and /or brother(s) yesterday?

____

What were they doing ?______________________________

____

E. When did X spend time with other children yesterday ? ______________

What were they doing ? ______________________________

F. When did X spend time with other adults yesterday ? ______________

____

What were they doing ? ______________________________

____

G. I'd like you to tell me about your activities during this last weekend ?

____

____

____

What did you do that was different ? ______________

____

____

H. When did X spend time with his father ? ______________

____

What were they doing ? ______________________________

____

QUESTIONNAIRE -- HOME INTERVIEW*

I BASIC CARE ROUTINE

II TYPICAL DAY

III HEALTH OF CHILD

IV MOBILITY

V SIGNIFICANT FAMILY EVENTS

VI DEMOGRAPHY

VII FAVORITE PLAYTHINGS

VIII TOPOGRAPHY

IX RESIDENCE RATING

X DEMOGRAPHIC CHART

*This Questionnaire was developed by: Jean Carew Watts (Project Director), Itty Chan Barnett (Assistant Director), Nancy Apfel, Christine Halfar, and Geraldine Kearse (former staff member).

HOME INTERVIEW

(X Indicates Child)

Child's Name ____________________ Age (months)______ Sex______ ID______

SES____________ ETH____________ REL____________

Address:____

Telephone:______________________________________

Date of Interview:________________________________

Interviewer:_____________________________________

I. BASIC CARE ROUTINE

A. Sleep

1. When does X usually awake?____________________________

2. Go to bed?____________________________________

3. Does X have a regular time for naps?_____No_______Yes

If yes, when?__________________________________

B. Meals

1.

(a) When does X usually have breakfast?___________________

(b) lunch__________________(c) supper__________________

(d) snacks__________________

2. Does he ever have a bottle?____________________________

3. Does X feed himself?________________________________

4. Does he get himself a glass of water or a snack when he wants?

____

C. Toilet

1. Is X toilet trained?________________________________

2. When did you finish toilet training him?__________________

3. Does X dress himself (except for shoes)?__________________

4. Does X wash his hands by himself?______________________

5. Does X brush his teeth by himself?_____________________

D. Chores

1. Are there any little chores he usually helps you with?________

____

II. TYPICAL DAY OF THE WEEK (#1)

A. I'd like you to tell me as much as possible about your activities and those of X yesterday. We have found that we can learn a great deal about a child if we follow his activities closely for one whole day. It will also help us choose the most convenient time to visit your house. So try to remember everything you and X did yesterday starting from about this time yesterday to the time X went to bed and from the time he got up this morning to now. Take it hour by hour and try to remember.

Time	Where was X?	With Whom?	What was X doing?	Where were you?

TYPICAL DAY OF THE WEEK. (Cont'd)

Time	Where was X?	With whom?	What was X doing?	Where were you?

B. Would you say that yesterday was a pretty typical day for X?

____

____

C. In a typical day during the week, when would X spend time with his father? ________________________________

What would they be doing? ________________________

____

D. When would X spend time with his sister (s) and/or brother (s)?

____

What would they be doing? ________________________

E. When would X spend time with children other than his brothers or sisters?

____

What would they be doing? ________________________

____

F. When would X spend time with other adults? ________________

What would they be doing? ________________________

____

____

G. I'd like for you to tell me about your activities during the weekend. What do you usually do that's different from what you do on a week-day?

____

____

H. On a typical week-end, when would X spend time with his father?

____

____

What would they be doing? ________________________

____

____

III. HEALTH

A. Is X healthy?______________________________

B. Does X have any difficulty in seeing or hearing?__________

C. Any other physical difficulties?____________________

D. Has he had any important medical or surgical experience?______

E. Has there been anything unusual in the X's development?______

F. Has anyone, including you and your husband, had any health problems since X was born?________No ________Yes________

If yes, has this person had to be away from home, or has this affected your routine?

____

____

____

IV. MOBILITY/SUPERVISION/RANGE OF EXPERIENCE

A. Are there any rooms in the house into which X must not go unless an adult is with him? ____________________

B. Any parts of rooms (e.g., closet)? ____________________

C. Any equipment he must not touch? ____________________

D. Any furniture he must not climb on? ____________________

E. Any furniture he must not sit on? ____________________

F. Is there any special room or part of a room where X is supposed to play when he's indoors? ____________________

G. Where may X play when he is out of the house? ____________________

1. Private or semi-private yard
2. Open space available on grounds or building
3. Park within walking distance
4. Vacant lot or space
5. None available
6. Other ____________________

H. How many times during the week do you take X out with you, such as errands, visits, trips? Where do you usually take him?

1 2 3 4 5 6 7 or more ____________________

How many times during the weekend do you take X out with you? Where do you usually take him?

1 2 3 4 5 6 7 or more ____________________

I. Do you let X play outside the house when you are not with him?

0 = No

1 = In the yard or on porch only

2 = at neighbor's or relatives' house

MOBILITY/SUPERVISION/RANGE OF EXPERIENCE (cont'd)

J. Do you usually plan X's playtime for him? Or do you leave it up to him? ______________________________

____

K. Do you usually take part in any of X's activities? 0 = No 1 = Yes

If yes, which ones? ______________________________

____

L. How much time per day do you spend reading to X?

____

____

M. How much time does X spend watching T.V.? ______________

What program (s) does he watch? ______________

____

V. SIGNIFICANT FAMILY EVENTS

Interviewer: "Now I would like to get some idea of how many family changes have occurred since X was born."
(Ask the following questions)

A. Since X's birth, has the family had any major difficulty, such as divorce, death, separation, remarriage?

0 = No 1 = Yes________________(Specify)

B. Have you worked full time or part time since X was born?

0 = No 1 = Yes

1. If yes, when did you start that job? How long did you continue? Who took care of X during that time?

	Start	Stop	Caretaker
a.			
b.			
c.			

2. If not, how many different caretakers have you had to take care of X on a regular basis since X was born?

	Start	Stop	Caretaker
a.			
b.			
c.			

C. Have there been any other family events that you think might have some influence on X's behavior or development?

0 = No 1 = Yes ________________(Specify)

D. Do you have babysitters from time to time? Yes_____ No_____

If so, how often?________________________________

Is this usually the same person or does it vary?

VI. DEMOGRAPHIC INFORMATION, QUESTION FORM:

Use a separate question form for each individual. Start with children doing oldest to youngest, then do mother and father. Ask all questions, and write in exact response in the space provided on left. After interview, consult KEY on right and enter code on chart on Page 15.

Name:______________________________ Relationship to the subject:__________________________

Interviewer: "I would like to ask you some background information. You must not feel obliged to answer these questions if you want to keep the information private."	Key:
a. Sex - Ask only when it is necessary	a. Sex: 1 = male; 2 = female
b. Age How old are you (is X?)__________ When is X's (children) birthdate?______	b. Age: Fill in
c. Where grew up: Where did you (X) grow up? ________________ ________________ ________________	c. Where grew up: 1 = Greater Boston 2 = East Coast, D.C. to Maine; 3 = Midwest 4 = West Coast 5 = South and Southwest 6 = Foreign
d. Urban: Is it a large city? etc. ________________ ________________ ________________	d. Urban: 1 = large city (e.g. N.Y.C., Boston); 2 = small city (less than 100,000 population 3 =e.g. (Cambridge) near metropolitan area 4 = Suburban 5 = Small town 6 = Farm country
e. Education: For Adults: What is the last grade you completed in school?________ What education have you had since high school?________ For Children: Where is X going to school, and what grade is he in now?________	e. Education 1.= Graduate professional training 2 = Standard college or university graduation 3 = partial college/junior college/vocational school 4 = high school graduation (12th G.) 5 = partial high school (10th - 11th G.) 6 = Junior high school (7th - 9th G.) 7 = Elementary School graduation (6th G.) 8 = Less than six years of school

Question Form (cont'd)	Key: (cont'd)
f. Occupation:* Do you have a job outside the house? _____ What is your husband's work? _____ (Find out responsibilities involved in his job) _____ Does X (other adults or children) have a job? _____	f. Occupation:* 1 = Executive (large firm) and upper Professional 2 =Executive (small firm) and lower professional 3 =Technical and supervisory 4 =White collar worker 5 = Skilled blue collar worker 6 = Semi-skilled 7 =Unskilled 8 = Unemployed
g. Ethnic: Do not ask this question. Guess your answer, and write down information on which your guess is based. _____	g. Ethnic: 1 = Afro-American 2 = Afro-West-Indian 3 = Afro-Latin-American 4 = Chinese and other Oriental 5 = Irish; 6 = Italian; 7 = Jewish; 8 = Portugese; 9 = Spanish-American; 10 = Other Caucasian; 11 = Other
h. Religion: Would you mind telling me what your (X's) religion is? _____	h. Religion 1 = Catholic 2 = Jewish 3 = Protestant 4 = Other 5 = None
i. Family Income: Would you mind telling me your family income? (1) Is it under $3,000? (2) Is it between $3,000 and $7,000? (3) Is it between $7,000 and $12,000? (4) Is it between $12,000 and $20,000? (5) More than $20,000?	i. Family Income: 1 = under $3,000 2 = $3,000 to $7,000 3 = $7,000 to $12,000 4 = $12,000 to $20,000 5 = over $20,000

---

*See the Hollingshead Scale. In deciding between 1 or 2, take into account S's education and job responsibilities, e.g. chemist or stockbroker can be classified 1 or 2.

Question Form (cont'd)	Key: (cont'd)
j. Language at home: Do you (X) speak English only at home? ____________________________ Does X speak English to his babysitter, etc.? (if appropriate) ____________________________ ____________________________	j. Language spoken at home: 1 = English only 2 = English and Chinese equally 3 = Chinese mostly, and some English 4 = Chinese only 5 = English and European languages equally (German, French, Spanish, Italian, etc.) 6 = European mostly and some English 7 = European only
k. Marital status Are you married?________________	1 = married 2 = separated 3 = divorced 4 = widowed

VII. FAVORITE TOYS AND PLAYTHINGS

Would you please tell me what are X's favorite toys and playthings?

____

____

____

____

____

VIII. TOPOGRAPHY

Make a map including approximate size and location of rooms and major pieces of furniture. Number the rooms.

IX. RESIDENCE RATINGS

This section to be rated after the interview.
IMPORTANT: Do not ask these as questions.

A. Home (Rate the following):

1. Type: (1) Single family house (2) Two or three family house
   (3) Apartment in apartment house (4) Apartment over store
   (5) Public housing (6) Other

2. Ratio of rooms to people_______________________________________

3. Quality of building in which the family lives:

   (1) Excellent = well-built, well-kept, expensive
   (2) Good = well-built, well-kept, modest
   (3) Fair = evidence of upkeep, but not enough
   (4) Poor = inadequate upkeep, inadequate building
   (5) Deteriorated = extremely poor building quality

4. Quality of Interior of Home:

   (1) Excellent = clean, good condition, well furnished
   (2) Good = generally excellent but very modest or some inadequacies
   (3) Fair = generally fair, some items poor
   (4) Poor = everything poor or some fair and some very inadequate
   (5) Deteriorated = very poor, extremely inadequate

5. Appliances available:

Washing machine___	Freezer___	Car___
Dryer___	Dishwasher___	Television___
Stove___	Vacuum Cleaner___	Phonograph___
Refrigerator___	Telephone___	Radio___

B. Neighborhood (Rate the following):

1. What is the mixture of business, industry and residential in this block?

   (1) entirely residential (2) mostly residential and a few stores

(3) mostly commercial -- many stores

(4) mostly industrial -- factories

2. What type of housing is there in the block?

(1) mostly one-family houses

(2) one-family and multiple-family houses

(3) one-family houses and apartment buildings

(4) almost no one-family houses

3. Quality of housing in neighborhood:

(1) Very good = large houses in top repair; exclusive apartment buildings.

(2) Good = medium to large single-family houses in good repair, but little ostentation in house or on grounds; apartment houses with medium to large flats, well-kept, but no fancy display.

(3) Average = small and neat single-family houses (6 rooms or less); the best quality two-family houses with adequate yard space; small apartments in clean but plain buildings -- strictly utility.

(4) Fair = small houses in poor conditions; average two-family houses, not much yard space; apartments in deteriorated buildings (often converted from large homes).

(5) Poor = run-down building but repairable (semi-slum).

(6) Very poor = building beyond repair, unhealthy and unsafe, area very unattractive -- broken windows, trash about.

C.

1. Describe the home in terms of size, maintenance, furnishings, status, etc.

2. Describe the immediate neighborhood in terms of size and maintenance of homes on the street, presence of commercial establishments, trees and open spaces, status, etc.

____

____

____

____

____

X. DEMOGRAPHIC CHARACTERISTICS - After Interview Transfer Information from Demographic to this chart.

A. Individuals:

Adults	Sex	Age	Where Grew Up	Urban	Education	Occupation	*Ethnic Group	*Religion	*Income	Language Spoken at home
1. Mother										
2. Father										
3. Caretaker (Specify)										
4. Other adults (Specify)										
5.										
6.										
7.										

Children (list in birth order starting with the oldest	Sex	Age in Months	Birth Date	Where Grew Up	Grade in School	*Ethnic	*Religion	Language
8.								
9.								
10.								
11.								
12.								
13.								
14.								

*Do not ask

**Stress this question as optional